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U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

REPORT
OF THE
UNITED STATES COMMISSIONER OF FISHERIES

FOR THE FISCAL YEAR 1936

WITH

APPENDIXES

FRANK T. BELL
COMMISSIONER

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NOTE

The first section of this volume, entitled "Bureau of Fisheries," constitutes what was known in years prior to 1933 as "Report of the Commissioner of Fisheries." Since then, in the interests of economy, it is a reprint from the "Annual Report of the Secretary of Commerce." The pagination, therefore, is the same as that of the Secretary's Report, rather than beginning with page I.

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U. S. DEPARTMENT OF COMMERCE

BUREAU OF FISHERIES

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BUREAU OF FISHERIES

Available statistics indicate greater activity in the fisheries and fishery industries during the calendar year 1935 than in any of the several immediately preceding years. This was not only true in the case of processed fishery products but also was evident in the markets for fresh and frozen (including packaged) fish. Average prices for the year advanced for some commodities; such advances were usually small and frequently prices were lower than in the preceding year. However, the industry appeared to be adjusting itself to existing price levels and to be in a generally healthier condition than for several years.

The domestic commercial fisheries are conducted on the high seas as well as in coastal waters and interior lakes and streams. Based upon available statistics for the calendar year 1934, when the most recent detailed catch surveys were made, there was a large increase in the catch as compared with the preceding calendar year. Statistics of the catch were collected for both 1933 and 1934 in the Chesapeake, Pacific, and Lake States, and in Alaska. When considering the combined catch in these sections alone, an increase of 50 percent in the volume and 33 percent in the value of the catch was indicated. While these increases were reflected in each of the four geographical sections and in many species, they were especially important in increased catches of pilchard, mackerel, and tuna and tunalike fishes in California.

Based on the most recent surveys, our commercial fisheries gave employment to about 123,000 fishermen, whose catch amounted to 3,950,779,000 pounds, valued at $74,163,000. The output of canned fishery products in 1934 amounted to 700,157,000 pounds, valued at $80,021,000, representing an increase of 31 percent in volume and 34 percent in value as compared with 1933; the output of byproducts was valued at $22,608,000, representing an increase of 29 percent; and the production of frozen fishery products, excluding packaged products, amounted to 97,290,000 pounds, estimated to be valued at $8,500,000.

Based upon the most recent surveys, the production of fresh and frozen packaged fish and shellfish amounted to 150,593,000 pounds, valued at $20,678,000; and cured fish, 98,141,000 pounds, valued at $13,047,000. It is estimated that about 650,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about $52,000,000, were marketed during 1934. Thus, the total marketed value of all fishery products to domestic primary handlers in 1934 reached nearly $200,000,000.

Imports of fishery products for consumption during the calendar year 1934 were valued at $30,790,000, which is 1 percent more than in 1933, while exports were valued at $13,822,000, or 66 percent more than in the previous year.

FISHERY ADVISORY COMMITTEE

During the past fiscal year the Fishery Advisory Committee for the Secretary of Commerce held meetings in the Commerce Department Building, Washington, D. C., on October 21 and 22, 1935, and January 13 and 14, 1936. These were under the chairmanship of E. B. McGovern, vice Bernarr Macfadden, resigned.

Both of the meetings were well attended by the members of the committee and others, who have been appointed from various branches of the fishery industry and related interests, including science, medicine, and transportation. The purpose of the committee is to give detailed consideration to the problems of the industry from a mutual standpoint and to offer recommendations for the promotion and development of the general welfare of the fishery industry.

The committee was especially active in promoting desirable Federal legislation to aid the industry along the line of market and economic research, and in conservation, and trade-practice matters. The work of the committee undoubtedly was largely instrumental in having Congress ratify the sockeye-salmon treaty with Canada which has been pending for several years, and which gives promise of restoring to former abundance the great sockeye-salmon fishery in the waters contiguous to the State of Washington and British Columbia.

PROTECTION OF SALMON IN THE COLUMBIA RIVER

The Columbia River supports one of the most important salmon fisheries on the Pacific coast. Owing to the intensive fishing near the mouth of the river and in adjacent areas at sea, the increase of agriculture and forestry, and the impending industrial development of the region, these valuable fisheries are being menaced by new conditions inimical to natural propagation of the fish. Hence the preservation of the fishery depends upon careful management, and the coordination of various demands on the Columbia waters to adjust the conflicting requirements. Complete management of the Columbia River fisheries includes (1) the regulation of the commercial fishery to permit adequate escapement of spawning fish, (2) the assurance of free access to their natural spawning areas, (3) the rehabitation by natural or artificial propagation or transplantation of formerly productive spawning areas, (4) the exclusion of pollution from nursery areas, and (5) the assurance of free return of the young to the sea without loss from irrigation works or hydroelectric plants.

A comprehensive investigation of these various fields, started 2 years ago, involves a statistical study of the annual and seasonal fluctuation in the abundance of the important species of fish contributing to the commercial fisheries. Records since 1897 have been made available through the cooperation of the commercial fishery interests on the river, and these have been tabulated and partially analyzed during the year to provide evidence of suspected depletion of certain elements of the fish population.

A comprehensive program of stream survey has been continued, contributing information on (1) the total area of present and past spawning grounds in each tributary, (2) the location of areas now available, (3) the location of former spawning areas now destroyed or rendered inaccessible, (4) the sources of pollution, (5) the number and location of irrigation canals and their effect on migratory fishes, (6) the location of natural and artificial obstructions and their effect as barriers to upstream migration, and (7) the general status of the salmon populations in the river system. Most of the tributaries of the Columbia River in eastern Washington and a few in the lower section have been surveyed during the year, totaling 1,100 miles of tributary streams.

In order to gage the size of populations of salmon that must be artificially propagated after their migration is finally barred by the Grand Coulee Dam, counting weirs have been established in two of the tributaries below the dam and observers have been stationed at the Rock Island Dam to count the fish passing these points. Through these studies it has become apparent that the two fish ladders at the Rock Island Dam are inadequate to provide free passageway without serious delay, and hence, on recommendation of the Bureau of Fisheries, a third fish ladder has been constructed in time to care for the summer migrants of 1936.

As a part of the entire program for the protection of the Columbia River salmon, but conducted as a separate project, the Bureau has been engaged for over 2 years in an intensive study of the requirements of fish protection at the Bonneville Dam on the lower Columbia River, working in cooperation with the United States engineers and the State fish and game departments. Detailed designs of fish protection works, embodying an improved type of gravity fish ladder and hydraulic lifts or locks, have been prepared and formal recommendations were submitted to the War Department in August 1934. After prolonged consideration, the War Department approved the plan for fishways that for the greater part followed the recommendations of the Bureau.

During the fiscal year just closed, in addition to completing detailed designs outlined in the general plan and rendering expert advice and supervision during their construction, the Bureau's staff has been mainly concerned with devising temporary fishways to afford free passage to migrating salmon during the period of construction of the main dam and powerhouse. In the course of this work many difficulties arose from unusual flood stages of the river, and plans have been altered frequently and temporarily expedients adopted. In general, however, adequate protection has been afforded the runs of migrating fish during the spring months, and more elaborate protective measures have been adopted by the United States engineers.

SOCKEYE-SALMON TREATY

After almost 40 years of consideration and discussion, a treaty for the protection of the sockeye salmon of Fraser River was ratified by the United States Senate on June 15, 1936, with certain reservations which are believed to be acceptable to Canadian interests. This treaty, signed in 1930 and ratified by Canada in the same year, provides for an international fisheries commission of six members, three on the part of the United States and three on the part of Canada. The commission is charged with the duty of making extensive investigations of the natural history of sockeye-salmon runs to Fraser

River and is granted authority to regulate the salmon fisheries in international and territorial waters through which Fraser River sockeye salmon pass on their spawning migration.

Although the reservations to this treaty completely nullify the regulatory authority of the commission for a period of 8 years, during which time scientific investigations shall be conducted, it is felt that a forward step has been taken to protect this resource, which has declined rapidly since 1913.

CONSTRUCTION ACTIVITIES

New construction during the year has been confined almost entirely to fish-cultural stations. During the early part of the year, the Works Progress Administration allotted funds for construction of new fish-cultural substations at Uvalde, Tex.; Santa Rosa, N. Mex.; and Smokemont, N. C., in the Great Smoky Mountain National Park. Active construction was initiated in November and the New Mexico project was completed by the close of the fiscal year. In North Carolina, the new hatchery was placed on a producing basis, but was not fully completed. In Texas, work progressed very favorably but much remained to be done at the end of the fiscal year.

In addition, the Bureau supervised the construction of hatchery facilities where the work was being performed by other agencies, with the intent of having the operation taken over by the Bureau upon completion. Such projects were located at Walhalla, S. C., under sponsorship of the Forest Service, at Norris Dam, in cooperation with T. V. A. authorities, and at Hoffman, N. C., the site of a Resettlement Administration project. The last two units were nearly ready for operation at the close of the fiscal year. In addition to this, local W. P. A. agencies sponsored projects comprising the enlargement and improvement of several of the Bureau's hatcheries, including those at Rochester, Ind.; Natchitoches, La.; and Lake Mills, Wis.; and in the Upper Mississippi Wild Life and Fish Refuge.

Development work also continued at the York Pond, New Hampshire, brook trout station, labor and materials being furnished by the Emergency Conservation organization and the W. P. A. Minor improvements were effected at the Lamar, Pa., hatchery through the assignment of C. C. C. workers.

Comparatively little maintenance or improvement work could be performed under the regular appropriations, since it was necessary to devote these funds to the production of fish.

CONSERVATION OF WHALES

An act, to give effect to the Multilateral Convention for the Regulation of Whaling concluded at Geneva, September 24, 1931, signed on the part of the United States March 31, 1932, and which became effective January 16, 1935, was approved by the President on May 1, 1936. The administration of the act rests jointly with the Secretary of Treasury and the Secretary of Commerce, each of whom is charged with specific duties. Enforcement matters in general are to be carried on by the Coast Guard and Customs Service of the Treasury Department, and the licensing features and collection of statistical and biological data are to be performed by the Bureau of Fisheries of the Department of Commerce.

The whale fisheries by United States vessels are prosecuted mainly off the coasts of Alaska and California, with one vessel from New York conducting operations off the coast of Australia.

EXHIBITS AT EXPOSITIONS

During the past fiscal year the Bureau displayed exhibits depicting its activities at expositions in San Diego, Calif., Dallas, Tex., and Cleveland, Ohio. The main feature of the exhibits at the first two expositions included a painted background of an outdoor scene. The foreground consisted of rocks, bushes, and plants grouped around a pool of water stocked with warm-water fishes such as bass and bream. The main feature at the Cleveland Exposition was a mechanical diorama depicting the effect of thermal conditions in Lake Erie on the prosecution of the commercial fishery. These exhibits were financed by a portion of the special allotment granted to Federal agencies by Congress for participation in the expositions.

COOPERATION WITH STATE AND EDUCATIONAL INSTITUTIONS

In the conduct of its statistical research work, some form of cooperation is given the Bureau in almost every State where commercial fishing is prosecuted. This cooperation on statistical work has probably reached its greatest development in the Lake States, the Pacific Coast States, and in Maryland and Virginia.

In the technological work of the Bureau many State agencies have cooperated in placing at the Bureau's disposal their facilities and members of their scientific staffs for the conduct of these investigations. Among the institutions cooperating in this work are the State Medical College, Charleston, S. C.; Massachusetts State College, Amherst, Mass.; Massachusetts State Department of Agriculture, Boston, Mass.; George Washington University, Washington, D. C.; Cornell University, Ithaca, N. Y.; Washington State College, Pullman, Wash.; University of Washington, Seattle, Wash.; University of Maryland, and the Maryland State Agricultural Experiment Station, College Park, Md.; and Western Maryland College, Westminster, Md.

There are numerous informal agreements and arrangements in effect whereby the Bureau and the States cooperate in the operation of hatcheries, distribution of fish and related fields. Such an agreement covers the work at the York pond, New Hampshire station, located in the White Mountain National Forest, and also at the Bureau's Put in Bay, Ohio, hatchery.

The Bureau's White Sulphur Springs, W. Va., station has continued to be a source of raw material in the form of trout fry which are transferred to the State rearing projects.

Indiana and Ohio have again depended upon the Bureau for the limited number of trout required for the waters of those States. In the West, much of the cooperation is connected with the collection of trout eggs.

Review of Federal applications by State authorities and coordination of distribution is now such a routine matter as to require no special comment.

Field studies on fishing and stream conditions have been conducted in a number of widely separated localities. In New Hampshire the legislature has established a series of test streams in which experimental plantings of various species of trout have been made and a careful check of the results of these plants has been obtained through a system of anglers' reports. A similar test stream has been under observation in Virginia to determine the production of rainbow trout in relation to the number of fish planted and the abundance of natural food. In California studies of a number of streams and lakes in the high Sierras and in the coastal region have been conducted in cooperation with the State authorities. Particular attention has been given to the management of runs of steelhead trout in coastal streams and to the proper stocking and management of mountain streams. Efforts have been directed toward the stocking of more heavily fished waters with fish larger than those commonly used, and a strain of nonmigratory rainbow trout is being developed at the experimental hatchery.

COOPERATION WITH OTHER FEDERAL AGENCIES

Various members of the technological, economic, and statistical staffs of the Bureau have assisted other Federal agencies where the work or studies of such agencies required information or advice concerning the fishery industry. The Bureau also has continued the collection of statistics of cold-storage holdings of fish in cooperation with the Bureau of Agricultural Economics, Department of Agriculture; the collection of data on landings at the Municipal Fish Wharf and Market in Washington, D. C., in cooperation with the District health authorities; and the collection of statistics on the quarterly production and holdings of fish oils for the Bureau of the Census. Studies were conducted in cooperation with the Bureau of Chemistry and Soils and the Food and Drug Administration, in connection with the development of standards for halibut-liver oil as required in the administration of the Federal Food and Drug Act.

Excellent cooperative relations have been maintained with Federal agencies concerned with the administration of wildlife or of areas supporting wildlife.

The Bureau has assisted the Tennessee Valley Authority in working out a general program of fisheries conservation and specifically has supervised the construction of a small hatchery at Norris Dam, supplementing this by allotting a number of consignments of fish from the Marion, Ala., hatchery.

The Resettlement Administration has constructed a first-class small hatchery at its Hoffman, N. C., project, and operating responsibility was being assumed by the Bureau at the close of the year.

Even closer contact has been developed with the Forest Service, and there has been an expansion in the number of fish-rearing units in national-forest holdings. Plans have been developed for the provision of fish-cultural facilities at the Bureau of Reclamation's Elephant Butte Reservoir, in Arizona.

The work of maintaining good fishing in national-park waters has been prosecuted vigorously with the sympathetic cooperation of the National Park Service.

Cooperation with the United States Forest Service in the management of fishing waters during the past year has been very effective despite limited funds and personnel on the part of the Bureau. Under the terms of the cooperative agreement with the Forest Service the Bureau of Fisheries assumes responsibility for conducting research necessary for the development of a comprehensive program of fish management for waters of the national forests. The chief activities in this field have been concerned with the improvement of streams and with providing feeding and resting areas for trout. At the end of the last fiscal year the Bureau conducted a training school in Utah and North Carolina for stream technicians of the Forest Service. These technicians then undertook an extensive program of stream conditioning in the various national forests directing the efforts of the Civilian Conservation Corps in the removal of obstructions of various kinds that interfered with the movements of fish, the planting of shade trees to protect and beautify the streams, and the correction of the ravages of deforestation and erosion by installing dams and deflectors to control the water flow and to create resting pools for trout and improved feeding and spawning areas.

In view of urgent need for further information on the value of stream improvement and of other means of improving fishing conditions in the national forests, arrangements were made for a number of experimental projects to be carried on in cooperation with the Forest Service and in some cases with State conservation agencies. In addition to the establishment of test streams in Vermont, such projects have been established in the Pisgah National Forest of North Carolina and in the Big Levels Game Management Area of the George Washington National Forest of West Virginia.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

The control of commercial fishing in Alaska to assure the maintenance of the fisheries resources on a maximum scale of productivity was continued in accordance with the authority vested in the Secretary of Commerce by the act of June 6, 1924. Particular attention was given to securing an escapement of at least 50 percent of the salmon runs in all localities; a proportionately larger breeding reserve was required where evidences of depletion were apparent.

Because of the recurrent scarcity of red salmon in the important Bristol Bay region in calendar years divisible by five, the regulations issued for 1935 prohibited commercial fishing in that district. As the season advanced, however, larger runs appeared than had been anticipated, and certain waters were opened for limited fishing after July 3. A few other modifications of existing regulations were made during the season, among which was the curtailment of fall fishing in parts of southeast Alaska where there had been an inadequate escapement from the earlier runs of breeding salmon to the spawning grounds.

Under the revised regulations, issued on February 8, 1936, six fewer trap sites were open than in the preceding year, the salmon-fishing season was lengthened in several districts, additional localities were opened to gill nets, and in the Cook Inlet area there was a shortening of the required distance interval between gill nets. Greater protection was provided for the herring in southeast Alaska and for the crab fishery.

Twelve regular and 170 temporary employees, in addition to the crews of 14 vessels of the Bureau and 2 chartered vessels, participated in the patrol of the fishing grounds. Chartered airplanes were used for a supplementary patrol in southeast and central Alaska, chiefly during the weekly closed periods, and for inspection of the spawning grounds and general supervision of the Bureau's work.

Biological studies of the life histories of the Pacific salmon and herring were continued. Tagging experiments were conducted in southeast Alaska to develop additional information regarding migration routes of pink salmon and herring. Weirs for counting the escapement of spawning salmon were operated in 11 typical salmon streams as a means of determining the ratio of escape to catch and also to provide data needed in scientific investigations.

Insofar as practicable in connection with their patrol duties, stream guards removed log jams and other obstructions that hindered the passage of salmon to the spawning grounds. Further improvement in the natural propagation of salmon was accomplished in certain localities by the taking of predatory trout destructive to salmon eggs and fry. In addition to the appropriation by the Territorial legislature and contributions from local salmon packers for this purpose, an allotment was made by the Works Progress Administration from funds available under the Emergency Relief Appropriation Act of 1935, which permitted an extensive predatory-fish control program in the Bristol Bay district in the 1935–36 season. Funds were provided also by that administration for repairing the marine ways at Naknek and for the construction of a fish ladder and other stream improvement in southeast Alaska. The total expenditures from the W. P. A. allotment amounted to approximately $45,000.

The Commissioner of Fisheries was in Alaska during the greater part of August for personal observation of fishery activities. Earlier in the season Deputy Commissioner Jackson inspected the Bureau's operations in Alaska, both in respect to the fisheries and the Pribilof Islands fur-seal industry.

ALASKA SALMON HATCHERIES

Only one salmon hatchery was operated in Alaska during the year—at Hugh Smith Lake, in the southeastern district. A collection of 34,383,000 red-salmon eggs was made in 1935, from which 32,531,000 fry were produced and liberated in Alaska waters. At the rate of 40 cents for each 1,000 red or king salmon fry liberated, as provided by the Alaska Fisheries Act of June 26, 1906, the owners of this hatchery therefore were entitled to a rebate of $13,012 on license fees and taxes on their catch and pack of salmon.

PRODUCTS OF THE FISHERIES

While the quantity of Alaska fishery products in 1935 was considerably less than the record output of the previous year, it compared favorably with the average level of production. A marked feature of the 1935 season was the exceptionally small pack of red salmon, owing to comparatively light runs of this species in several districts and especially to curtailment of operations in the Bristol

Bay area in an effort to stabilize the future yield in that locality. The suspension of operations for several weeks in the Copper River region as a result of price disagreements between packers and fishermen also was a factor in limiting the season's output of red salmon. The total number of canneries operated decreased from 110 in 1934 to 99 in 1935.

Salmon products comprised approximately 72 percent in quantity and 88 percent in value of the total output of the Alaska fisheries in 1935. About 94 percent of the salmon products consisted of canned salmon, the pack amounting to 5,133,122 cases, valued at $25,768,136. Red salmon represented 16 percent and pinks 63 percent of the total pack of canned salmon, as compared with 35 percent and 51 percent, respectively, in 1934.

Operations in the herring industry were marked by a further expansion in the manufacture of meal and oil, a number of reduction plants having been opened for the first time in the Kodiak district. The production of Scotch-cured herring was more than twice that of 1934. Landings of halibut credited to the Alaska fleet in 1935 were considerably less than in the preceding year. Both the quantity and value of whale products increased, although fewer whales were taken than in 1934; there was also an increase in several of the minor fishery products, including clams and shrimp.

The total output of Alaska fishery products in 1935 was 366,351,000 pounds, valued at $31,231,000, as compared with a yearly average of 376,193,000 pounds, valued at $34,079,000 for the 5-year period from 1930 to 1934, inclusive. The value of the 1935 catch to the fishermen was approximately $8,703,000, or about $3,004,000 less than in the preceding year. There were 22,620 persons employed in the various branches of the fisheries, as against 26,190 in 1934.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

With the continued growth of the Pribilof Islands fur-seal herd under Government management the number of surplus male seals available for commercial use has gradually increased. In 1935 the take of sealskins was the largest in 46 years. A staff of Bureau employees directed sealing operations performed by natives of the Pribilofs and by approximately 80 temporary laborers from the Alaska Peninsula and Aleutian Islands. The Fouke Fur Co., of St. Louis, Mo., sent 23 of its men to assist with the work, particularly with the blubbering of sealskins on St. Paul Island. Most of the skins on the island are taken by the stripping process, which necessitates the removal of blubber before curing.

In 1935 the by-products plant on St. Paul Island was operated for the first time since it was reconditioned and equipped with modern machinery in 1931. About 78 tons of meal and 19,000 gallons of oil were produced, limited quantities of which were retained at the islands for fox feed. The bulk of the meal was shipped to the States for use as fish food at hatcheries of the Bureau, and the oil was sold in Seattle to the highest bidder.

Besides the usual upkeep and repair of buildings and equipment, a new schoolhouse on St. George Island was completed before the beginning of the fall term, and extensions of improved roads were made on both islands to facilitate the hauling of sealskins from the killing fields to the curing stations.

The Navy Department detailed the U. S. S. *Sirius* to transport the annual supplies to the Pribilofs and to bring out the season's take of sealskins. Valuable cooperative service was performed also by the Coast Guard in maintaining a patrol for the protection of fur seals during their northward migration and at the Pribilof Islands.

Fifteen percent of the sealskins taken on the Pribilof Islands in 1935 were delivered to the Dominion of Canada, as provided by the North Pacific Sealing Convention of 1911. The Government of Japan also is entitled to 15 percent of the annual take but receives its share from the net proceeds after the processed skins are sold at public auction.

Two hundred and one sealskins taken by the Japanese Government on Robben Island in 1935 were allotted to the United States in accordance with treaty provisions. They were received by the Fouke Fur Co., selling agents of the Department, at St. Louis, Mo., on January 2, 1936.

SEAL HERD

As of August 10, 1935, the computed number of animals in the Pribilof Islands fur-seal herd was 1,550,913, an increase of 120,495, or 8.42 percent, over the corresponding figure for 1934.

TAKE OF SEALSKINS

In the calendar year 1935 there were taken on the Pribilof Islands 57,296 fur-seal skins, of which 45,824 were from St. Paul Island and 11,472 from St. George Island. This is an increase of 3,826 over the number taken in 1934.

SALE OF SEALSKINS

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis, Mo., in the fiscal year 1936. On September 16, 1935, 11,869 black dyed, 11,831 Safari brown dyed, 650 logwood brown dyed, and 79 miscellaneous skins were sold for $569,708.10. At the same time 125 Safari brown dyed and 75 raw salted Japanese fur-seal skins were sold for $2,762.25, and 14 confiscated fur-seal skins, parchments, for $69. The Japanese skins had been allotted to the United States as its share of such skins taken in 1934.

At the second sale, held on April 27, 1936, 9,721 black dyed, 12,154 Safari brown dyed, and 498 logwood brown dyed skins were sold for $600,770.25. At the same time 171 Safari brown dyed, 1 washed and dried, and 29 unhaired and dressed Japanese fur-seal skins were sold for $4,814.75. These 201 skins were the United States Government's share of sealskins taken by the Japanese Government on Robben Island in 1935. There was sold also 1 confiscated fur-seal skin, raw salted, for $1.

Special sales of Pribilof Islands sealskins authorized by the Secretary of Commerce in the fiscal year 1936 consisted of 830 black dyed, 1,274 Safari brown dyed, and 25 exhibition skins, at a total of $53,377.92.

FOXES

The herds of blue foxes on St. Paul and St. George Islands require little care and produce sizable yields of pelts each year. Salted seal meat and prepared rations are fed to the animals during the winter months when the supply of natural food is scarce.

In the 1935–36 season 220 blue and 9 white fox skins were taken on St. Paul Island and 799 blue and 6 white skins on St. George Island, a total of 1,034. Six foxes trapped on St. Paul Island and 116 on St. George Island were marked and released for breeding stock. The reserve includes also many animals that did not enter the traps.

The 983 blue and 19 white fox skins taken in the 1934–35 season were sold at public auction in the fiscal year 1936. The blue pelts brought $24,952.50, and the white $304, a total of $25,256.50.

FUR-SEAL SKINS TAKEN BY NATIVES

Under the provisions of the North Pacific Sealing Convention of 1911, aborigines of the Pacific coast may take seals at sea by primitive methods. The sealskins thus obtained must be authenticated by Government officials before they can enter into commerce. The number of sealskins taken and authenticated in 1935 was 975, of which 59 were secured by natives of southeast Alaska, 75 by natives of Washington, and 841 by natives of British Columbia.

FUR-SEAL PATROL

A patrol for the protection of the Alaska fur-seal herd was maintained by vessels of the United States Coast Guard, supplemented in the spring by two of the Bureau's fishery patrol vessels.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

Walruses and sea lions in Alaska may be taken under restricted conditions, but the killing of sea otters is prohibited at all times.

In 1935 four residents of the Kodiak Island region were tried at Valdez and convicted of illegal killing of sea otters in the previous year. Several sea-otter skins which they had taken were confiscated by the Bureau during the year for sale at public auction for Government account.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

In listing an output of 8,120,000,000 eggs and fish from Federal hatcheries during the fiscal year 1936, there must be explanation as to the exact nature of this summary. The foregoing figure represents a maximum production from Federal hatcheries for any one year since their establishment. It is an increase of over 3 billion in excess of the 5 billion produced last year. However, the greater part of this increase is represented solely by eggs and fry of four marine species handled at three of the hatcheries in the New England area. In fact, 6¾ billion cod, haddock, pollock, and winter flounder were produced here. This work involves both the incubation of the eggs at the hatcheries and the planting of the fertilized eggs directly on the spawning grounds by spawn takers who have been placed aboard the commercial fishing vessels for the purpose of salvaging such eggs as may be obtained from the commercial catch. This form of by-product recovery is a relatively inexpensive contribution to the maintenance of the important New England shore fisheries. However, increases in output were recorded for other varieties, particularly game fish.

Owing to the large total, the relative percentage of game fish produced at the Federal hatcheries will be lower than heretofore, but the actual number is in excess of the output of last year. This is reflected in an increase in the distribution of larger fish or fingerlings from 133,600,000 to 157,000,000. There was no deviation in the list of various species propagated. As heretofore, trout eggs were allotted to the States wherever there was a surplus beyond the requirements of the Bureau's hatcheries.

PROPAGATION OF COMMERCIAL SPECIES

Marine species, Atlantic coast.—There has been cited previously the record-breaking production of cod, haddock, pollock, and flounder, derived from the three hatcheries located at Boothbay Harbor, Maine; Gloucester, Mass.; and Woods Hole, Mass. Four and one-half billion eggs were planted on the spawning grounds, the balance being transported to the hatcheries to be incubated and distributed as fry. The Woods Hole, Mass., station handled a limited number of mackerel in addition to the species mentioned above.

Pacific salmon.—Hatchery operations with the salmon of the Pacific coast were somewhat more successful than during 1935. A most gratifying increase was achieved in the production of chinook salmon, due to the excellent egg collections in the Columbia River territory. Also, the distribution of 17½ million sockeye salmon brought the output of this species up to normal. A few more silver salmon were handled; but there was a regression in the production of the chum salmon, which, however, is the least valuable of the five species.

Anadromous species, Atlantic coast.—An output of 12 million shad fry was substantially the same as the output of the previous year. Distribution of a million and one-half Atlantic salmon was a notable increase for this valuable species, which is making a gradual comeback in the State of Maine. Yellow perch fry were produced in large numbers at the Potomac River hatchery, though fewer than those produced the previous year. Effort was made to hatch shad at a new pond-fish hatchery at Harrison Lake, Va., but conditions were unfavorable. Shad cultural operations in South Carolina, in cooperation with the State, failed to reach the usual magnitude, owing to extremely adverse weather conditions.

Commercial species, interior waters.—This type of fish culture is prosecuted on a relatively limited scale at the present time. Slightly over 5 million whitefish fry were planted and less than a million lake trout and a limited number of lake herring were distributed. It has become extremely difficult for the Cape Vincent, N. Y., station to obtain a supply of eggs of these species and the Duluth, Minn., station is only able to obtain scattering quantities during the regular fishing season. The two Michigan hatcheries, closed during 1934, have remained inactive. At the Put in Bay, Ohio, station, work is conducted on a joint basis with the State. The Bureau assists in the collection of eggs which are incubated at the State hatchery and the distribution records therefore do not figure in the Bureau's summary. The Federal hatchery at Put in Bay hatched over 500 million pike perch during the spring months, however.

Game species.—The legion of sportsmen throughout the country will be glad to know that the Federal hatchery system provided a larger number of several of the more popular varieties. The fisherman of 2 or 3 years hence will benefit by an increase in the distribution of steelhead salmon, rainbow trout, and particularly largemouth and smallmouth black bass. Production of the latter was brought to more than 5½ million, which is still inadequate in view of the tremendous demand for the premier warm-water game fish. The lesser varieties of pond fish, such as crappie, sunfish, etc., were also distributed in increased numbers. A problem which is intensifying the need for greater hatchery production of game fish is the culmination of several years of effort in the building of artificial lakes for recreation, power, flood control, and water storage. These new potential fishing areas presented a new demand for hatchery stock at a time when production was already insufficient to meet the normal requirements.

RESCUE OPERATIONS

In connection with the administration of fisheries matters in the Upper Mississippi Wildlife Refuge, the usual rescue or salvage work was carried on in the sloughs during the late summer and early fall. Forty-three million seven hundred thousand fish were handled. While this was a decline of almost 4 million under the figures of the previous year, it approximates the normal average extent of this work.

The construction of the 9-foot channel in the Mississippi River through this area is affecting the rescue operations to some extent and ultimately will render such work unnecessary or impossible. As heretofore, the great majority of the fish rescued were returned directly to the river. Most of the shipments to other sections are being made from fish specially propagated in controlled ponds located at advantageous points in the refuge.

FISHERY INDUSTRIES

ECONOMIC AND MARKETING INVESTIGATIONS

Manual for economic fishery surveys.—A manual was prepared during the year to aid fishery management officials, teachers of economics, and others in making studies of fishery economics. This consists of schedules for obtaining primary market information, instructions for making surveys, sample forms for use in tabulating the data, and instructions for tabulating.

Survey of fish hatchery foods and feeding practices.—A survey made by the Bureau during the year showed that fish-hatchery operators used 11,455,000 pounds of fish food, valued at about $608,000, during 1934. Three-fourths of the volume consisted of such packing-house products as animal livers, hearts, and other animal organs. However, fishery products comprised a large portion of the fish foods used by commercial hatcheries, since they were available at about one-third the cost of meat and dairy products.

The oyster and oyster industry.—A popular publication on oysters was prepared by the Bureau during the fiscal year. It covered such salient factors as the biology of the oyster, methods of capture and handling, its food value, and recipes for preparing it for the table.

Cooperative marketing.—Under authority of an act authorizing associations of producers of aquatic products, approved June 25, 1934, a cooperative marketing unit was established in the Bureau of Fisheries in October 1935. This unit has conducted studies on the prevalence of fishery cooperatives in the country, State legislation pertaining to such associations, the nature and extent of existing fishery cooperatives, and cooperative activities in foreign countries. A publication outlining the methods for organizing and incorporating fishery cooperative marketing associations also was prepared for dissemination to interested parties.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, CALENDAR YEAR, 1934

New England States.—No complete statistical survey of the commercial fisheries of this area was made for 1934. The total landings of fish, however, by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 299,916,000 pounds, valued at $7,882,000--an increase of 18 percent in volume and 21 percent in value, as compared with the preceding year.

Middle Atlantic States.—No complete survey was made in this area for 1934. A survey made of the shad fishery of the Hudson River for 1934 showed 322 fishermen engaged and a catch of 438,000 pounds of shad, valued at $36,000—a decrease of 16 percent in volume and 12 percent in value as compared with 1933.

Chesapeake Bay States.—During 1934 the commercial fisheries of Maryland and Virginia employed 20,591 fishermen. Their catch amounted to 289,011,000 pounds, valued at $5,943,000—an increase of 6 percent in volume and 17 percent in value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 564 fishermen, who caught 567,000 pounds of shad, valued at $48,000, and 2,028,000 pounds of alewives, valued at $16,000.

South Atlantic and Gulf States.—The commercial fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas during 1934 employed 24,898 fishermen. Their catch amounted to 447,914,000 pounds, valued at $9,994,000—an increase of 49 percent in volume and 55 percent in value as compared with 1932 which is the most recent previous year for which a survey was made in this section.

Pacific Coast States.—The commercial fisheries of Washington, Oregon, and California in 1934 employed 19,232 fishermen. Their catch amounted to 1,546,102,000 pounds, valued at $19,950,000—an increase of 80 percent in volume and 43 percent in value, as compared with 1933. The total catch of halibut by United States and Canadian vessels amounted to 46,018,000 pounds, valued at $2,-

963,000—an increase of less than one-half of 1 percent in volume and 15 percent in value, as compared with the preceding year.

Lake States.—In 1934 the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, and Superior, Namakan and Rainy Lakes and Lake of the Woods of the United States and Canada) produced 124,148,000 pounds of fishery products. Of the total the United States accounted for 96,411,000 pounds, valued at $5,124,000—an increase of 29 percent in volume and 26 percent in value as compared with the United States catch in the previous year. The Lake fisheries of the United States gave employment to 7,579 fishermen in 1934.

Mississippi River and tributaries.—No complete survey of the commercial fisheries of the Mississippi River and tributaries was made for 1934. The catch of Lake Pepin and Lake Keokuk and the Mississippi River between these two lakes in 1934 amounted to 5,604,000 pounds, valued at $207,000—a decrease of 3 percent in volume and 11 percent in value as compared with the yield of the same waters in 1933.

MANUFACTURED PRODUCTS OF THE UNITED STATES AND ALASKA, CALENDAR YEAR 1934

Fresh and frozen packaged fishery products.—Based on the most recent available data, the domestic production of fresh and frozen packaged fishery products amounted to 150,593,000 pounds, valued at $20,678,000. Important commodities in this group were fresh-shucked oysters, 6,207,000 gallons, valued at $7,772,000; packaged haddock, 36,666,000 pounds, valued at $3,801,000; and fresh-cooked crab-meat, 5,574,000 pounds, valued at $1,904,000.

Frozen products.—The production of frozen fishery products in 1934 amounted to 133,494,000 pounds, estimated to be valued at about $12,000,000. The volume of the production was 39 percent greater than in 1933; the most important products frozen were ground fish, halibut, salmon, mackerel, and whiting.

Cured products.—Based on the most recent data available, the domestic production of cured fishery products amounted to 98,141,000 pounds, valued at $13,047,000. Important products in this group were smoked salmon, 8,321,000 pounds, valued at $2,348,000; mild-cured salmon, 9,829,000 pounds, valued at $1,841,000; and boneless cod, 8,993,000 pounds, valued at $1,637,000.

Canned products.—Canned fishery products produced in 1934 amounted to 700,157,000 pounds, valued at $80,021,000—an increase of 31 percent in volume and 34 percent in value as compared with 1933. Canned salmon alone amounted to 402,386,000 pounds, valued at $45,818,000. Other important canned products were tuna and tuna-like fishes, sardines, shrimp, mackerel, clam products, and oysters.

Byproducts.—During 1934 the value of the production of fishery byproducts amounted to $22,608,000—an increase of 29 percent as compared with the preceding year. Important products in this group were marine-animal oils and meals, and aquatic shell products.

TECHNOLOGICAL INVESTIGATIONS

Technological research in the fisheries covers a broad field which necessarily involves the sciences of chemistry, engineering, bacteriology, pharmacology, and general food technology toward the development of new processes and methods, the salvage of waste products, and toward the more complete utilization of the fishery harvest. Such investigations by the Bureau's technological staff have included the study of many problems in connection with the preservation of fishery products for food, in determining the role of bacteria in preservation and decomposition, in pharmacological studies of the metabolism of the mineral constituents of fishery products, in the preservation of fishery byproducts, in the nutritive value of aquatic products, and in fish cookery.

Preservation of fishery products for food.—Studies in this field include an expansion of the knowledge of the chemistry of fish preservation and spoilage, the development of electrometric tests for determining the freshness of various fish, methods for smoking fish, studies of rancidity in fish, the chemical composition of fish proteins, and the development of methods for canning aquatic foods. The problem of the rancidity of the oil or fat in such fatty fish as mackerel has been an acute one wherever it has been necessary to store these fish for any substantial period of time. Various harmless antioxidants are being tested to determine their possible value in preventing or retarding the rancidity which develops in these fish under commercial storage conditions. This work has not progressed to a point where definite recommendations can be made as yet. The electrometric test for determining the relative freshness of fish has been published for haddock and has been worked out for cod and pollock. The importance of fish proteins in the diet is determined by the kinds and amounts of amino acids which make up the chemical composition of such proteins. This work is of fundamental importance and it is hoped that sufficient progress will be made for the issuance of a publication by next year. During the past year the Bureau has published a report on the canning of aquatic foods.

Bacteriological studies.—These investigations include the development of disinfectants for sponges for household use, bacteriological examinations of experimentally canned fishery products, and studies of the role of bacteria in the preservation and decomposition of fish.

Pharmacological studies.—This is a new and extremely interesting investigational field as far as fishery products are concerned. It includes a study of the role of the mineral constituents of fishery products in the metabolism of man and his domestic animals. Several publications on this work have been issued by the Bureau during the past year, covering the metabolism of arsenic and copper as they occur naturally in fish and shellfish.

Preservation of fishery byproducts.—The Bureau's technological investigations in this field have been of great value to the agricultural industry, as such fishery byproducts as fish oil and fish meal are unexcelled animal feedstuffs. Fish oils and fish-liver oils are not only vitally important as a source of vitamins for use in medicine and human nutrition but are essential to the poultry industry as a source of vitamin D to replace the inadequacy of sunshine. Fish meal is a splendid protein concentrate used in mixed feeds for various farm animals. This product also is used in fertilizers. The work during the past year in this field has consisted in the improvement of methods for manufacturing these products and in the development of new products.

Nutritive value of aquatic products.—Studies in this connection have included determination of the vitamin potency of various fish-liver oils, of the development of menhaden fish oil for poultry feed, menhaden fish meal in cattle feed, studies of the nutritive value of mackerel, the biological value and digestibility of fish proteins, and studies of the mineral constituents in fishery products. Publications have been issued on these various products.

Fish cookery.—Work in fish cookery has consisted in the development and testing of a variety of recipes for preparing fish and shellfish. There is a great need for work in this field as the average housewife knows little concerning the possible varieties in the cooking of fishery products. A new cook book, published by the Bureau about a year ago, proved very popular and over 60,000 copies of this publication have been distributed, in cooperation with the fishery industry.

BIOLOGICAL FISHERY INVESTIGATIONS

Biological investigations of the fishery resources form the foundation of all conservation policies and recommendations of the Bureau of Fisheries. When the Bureau was first established, such investigations to discover the conditions and trend of the important fisheries, the causes for a decline in the supply of some which had been noted, and the devising of corrective measures were the sole functions of the organization; and these activities still constitute one of the most important branches of its work. During recent years investigations, organized on a continuing basis, are concerned primarily with (1) the tracing or foretelling of natural fluctuations in abundance of the important commercial species, (2) the management of interior waters including the stocking of lakes and streams with the most desirable food and game fishes at a rate consistent with the productive capacity of the various waters, with environmental control to increase productive capacity and with regulation of the catch to assure maximum production, and (3) the development of modern methods of water farming as applied to the shellfish industry.

INVESTIGATIONS OF COMMERCIAL FISHES

North and Middle Atlantic fishery investigations.—In the North and Middle Atlantic, haddock, mackerel, squeteague or weakfish, and the flounder, scup, sea bass, and related species taken in the shore fishery and in the Southern winter trawl fishery, are the subject of study. With the upturn of fish prices during 1935, activity in the fishing business in the North Atlantic section has reawakened. Vessels tied up during the previous years have been placed in service and new ones are being built, while the efficiency of smaller vessels has been increased by additional motorization. Species hitherto neglected or regarded as trash fish, such as the rosefish and the sea robin, are being marketed in rapidly increasing quantities.

Observations on the condition of the resource during the past year indicate that the supply of haddock, the most valuable and important species in the North Atlantic fishery, generally remains low as compared with the abundance prevailing 10 to 15 years ago, although the stock of Georges Bank and of the South Channel, which are the most productive grounds, apparently has increased somewhat over the previous year. Grounds for apprehension concerning the future of the resource still exist, as the production from areas nearer American ports has suffered a disastrous decline. Moreover, the distance from ports to grounds now most productive increases the cost of production.

The analysis of the commercial landings of the haddock fishery during recent years, based on personal interviews with captains, and size and age analysis of the population sampled by the commercial fishery, yield qualitative data regarding a change in the supply. Hampered by a lack of adequate personnel or sufficient funds, it has been impossible heretofore to study these changes quantitatively. It is essential to discover changes in the rate of natural reproduction and to evaluate as early as possible the abundance of young haddock year classes below marketable size as well as the natural rate of mortality. During the past 2 years the Bureau has had no vessel capable of making observations on the fishing grounds; hence one of the most urgent requirements of effective study of the commercial fishery in this and other regions is a sea-going research vessel, the construction of which was authorized by Congress in 1934 but for which no appropriations have been provided.

Mackerel in the North Atlantic area is at a high level of abundance, mainly as a result of the unusually productive spawning seasons of 1930, 1931, and 1933. Progress has been made in discovering the annual variations in natural reproduction which determine the number of mackerel in the sea and hence the success of the commercial fishery. Predictions of the yield for the following year have been issued with increasing accuracy at the beginning of each season for the past 9 years, and a comprehensive account of the major features of the biology of the mackerel that explains its startling variations in yield has been prepared for publication.

During 1935 the commercial yield of mackerel reached 53 million pounds, the record for the present century. However, during the decade ending 1935, the average annual yield was 41 million pounds, which contrasts poorly with the average of 80 million pounds produced during the decade ending 1885. Investigations have shown that these remarkable changes in yield are caused mainly by changes in abundance of mackerel and only secondarily by variations in the rate of fishing or by extensive migrations of the fish. Further, it has been learned that the changes in abundance are due to great differences from one year to another in the number of young mackerel that survive to reach commercial size.

Investigations of the fisheries of the Middle Atlantic States are intended to provide a rational basis for more efficient utilization of the fishery resources from southern New England to North Carolina. The fisheries of this region are very productive and extremely diverse. If the fisheries are to be protected and at the same time utilized fully, two requirements must be met: (1) The life history and conservation needs of all important species must be known and, (2) some provision must eventually be made for unified administration which is essential because of the migratory habits and the interstate traffic in the production of the fishery.

A comprehensive study of the more important features of the life history of squeteague or weakfish has been completed during the year and the preparation of a report is nearing completion. The outstanding feature is the fact that the squeteague spawn in inshore waters from Massachusetts to North Carolina in late spring and early summer. There is, however, uncertain survival of those spawned in northern waters. Those produced south of Delaware Bay spend their first year in the South and migrate northward as 2-year-old or older fish.

The fishery in southern waters, particularly in North Carolina, is unusually destructive to considerable numbers of young squeteague; but, because of the relatively slower rate of growth in southern than in northern waters, it is uncertain whether the restriction of fishing in the South would greatly augment the supply. It is apparent, therefore, that the problem of conservation presents quite different aspects according to the point of view from which it is examined. From the national rather than from the sectional point of view it is desirable to determine whether sufficient benefit would result from curtailment of the southern catch of yearlings to compensate for the resulting losses.

Similar destruction of immature scup, particularly in the newly developed winter trawl fishery off the Chesapeake capes, has been noted. This fishery, which developed rapidly into a major branch of the industry, has been subjected to study each winter since its origin and the effects of increasing exploitation of the scup have been observed.

Shrimp investigations on the South Atlantic and Gulf coasts.—The most important fishery of the region from North Carolina to Texas depends upon the common shrimp, which yields on the average 100 million pounds annually. Investigations of this fishery in cooperation with the various States has proceeded during the past year. Experience has shown that the shrimp supply fluctuates considerably from year to year in the different localities. These fluctuations indicate that definite changes in the population of shrimp occur, and that for a complete understanding of the fishery the nature of these causes must be determined. Consequently, the Bureau's investigations have been directed toward the discovery of the life history of the species.

During the year studies of sexual maturity and spawning indicate that, contrary to former beliefs, the shrimp in some localities may survive through two winters and spawn a second time. The character of food, which explains the concentration of shrimp generally about the mouths of rivers, has been ascertained, and studies of growth and larval development have been completed. Studies of migration during the year have shown that extensive and well-defined movements northerly and southerly occurred, particularly along the Georgia-Florida and the Texas coasts.

To test the intensity of the fishery, methods of tagging shrimp have been developed and applied. A total of 3,800 shrimp were tagged along the Georgia and Florida coast during the fall of last year, and the intensity of the fishery is evidenced by the fact that almost one-fourth of the tagged shrimp had been retaken by the fishermen and returned to investigators by December. During the coming year tagging operations will be extended throughout the entire area of the South Atlantic shrimp fishery.

During the fall and winter the majority of the larger shrimp disappear from their usual grounds, probably moving off-shore to deeper and warmer waters of the Gulf. Plans have been developed, therefore, through additional appropriations made by the last Congress, to equip the Bureau's motor ship *Pelican* for off-shore experimental fishing. It should be possible to determine whether this deep-water concentration occurs, and whether or not the shrimp congregate in sufficient quantities in these areas to make a commercial fishery feasible.

Pacific coast and Alaska fishery investigations.—Commercial fishery investigations on the Pacific coast and Alaska are confined mainly to the salmon and the herring. In the Pacific Northwest States the studies directed toward the management and conservation of the diminishing runs of sockeye salmon in Puget Sound and the Fraser River area and the runs of all species of salmon in the Columbia River (discussed previously) were continued; and in Alaska continued observations were made on the success of reproduction of red salmon in the Karluk River and the pink salmon and herring in southeastern Alaska. In addition a new and much needed investigation to measure variations in yield in the salmon fisheries of Alaska, dealing with the collection and analysis of daily catch records for the various types of fishing gear, was carried out during the past year.

In Puget Sound special attention has been given to a study of the sockeye salmon population spawning in the Fraser River and the coho salmon, the most important game fish in the Pacific Northwest. The trend of the sockeye salmon fishery at sea and in the sound has been studied by the collection and analysis of records of the commercial catch since 1915. This study will establish a solid foundation for active management of the fishery by the commission to be formed under the authority of the recently approved treaty between the United States and Canada. Observations on the life history of the coho salmon in Puget Sound have been conducted to determine changes in abundance and their underlying causes and to develop methods of rehabilitation of populations in streams now barren or depleted. Experiments have been conducted to determine the strength of the homing instinct by transplanting hatchery reared fish. Observations on rate of growth of fingerlings have also been made in different tributaries and extensive records have been obtained from both the commercial and sports fisheries to indicate the drain on the resource by these fisheries.

In Alaska the extensive series of observations over many years on the red salmon runs of the Karluk River on Kodiak Island have been continued to discover factors influencing the success of natural propagation in an attempt to forecast future runs more accurately. Another marking experiment was initiated in which nearly 50,000 fingerlings were marked by the amputation of a combination of fins. The commercial catch of the region was carefully observed to obtain records of marked adults returning from previous experiments. During the year complete returns from the 1929 spawning year were obtained. The escapement was 900,519 which bore a ratio to the spawning population of that year of 1.6:1 as compared with 2.2:1 for the 1928 escapement, and 1.8:1 for the 1927 escapement. This indicates a progressive decline in natural productivity, the returns being below normal.

From the marking experiments it is apparent that mortality from the seaward migrant stage to adult stage is about 75 percent. Mortality during the fresh-water period from eggs to seaward migrants is calculated to be 99.5 percent, hence the determination of the factors causing this extensive mortality during fresh-water existence is of great importance since any material increase in survival during this period would have the greatest effect in increasing the commercial runs.

Similar studies on the supply of pink salmon, the most valuable species in southeastern Alaska, were continued during the year. Pink salmon were also studied in cooperation with the National Canners' Association from the standpoint of physical and chemical changes that occurred in the body during their spawning and migration from the sea. The results provide information relative to the seasonal changes in the market quality that is of primary importance in the canning industry.

During the past 2 years a statistical study of the commercial salmon fishery in southeastern Alaska has been under way involving the collection, compilation, and biometrical analysis of the daily catch records of various types of fishing gear employed in the Alaska salmon fishery. These records provide the basic data for studies on changes in the abundance and character of the salmon runs and competition between the various types of fishing gear, as well as information for the future delimitation of the fishing districts and the establishment of closed seasons for fishing in the region.

During previous years investigations of the herring fisheries in Alaska have demonstrated the existence of a considerable number of distinct races of herring, each inhabiting a restricted area. In some of these areas serious overfishing that has resulted in virtual destruction of the industry has occurred. Investigations have been conducted during the past year to delineate more accurately the areas inhabited by the separate races. Notable results include the perfection of a new method of tagging herring to trace their migrations and to secure the return of tagged fish.

Great Lakes fisheries investigations.—It is generally conceded that certain important fisheries in the Great Lakes have been depleted or are undergoing depletion from overfishing. The virtual disappearance of the cisco in Lake Erie since 1926 has been so dramatic that the fact of depletion brooks no argument, and the decline of the whitefish yield in the lake system in general and its rapid disappearance from formerly productive grounds in more recent years is well known. The valuable fisheries in the Great Lakes, however, are being maintained at only moderately reduced levels, chiefly by increasing dependence on other species such as the pike-perch, the yellow perch, the lake trout, and the various species of herrings and suckers. In order to measure the annual fluctuations in the abundance of these species, to discover the need for protection and to determine the value of fishery regulations, an analysis of the catch statistics gathered by the State of Michigan in Lake Erie, Lake Huron, and Lake Michigan has been undertaken as a major project. The basic tabulations have now been completed for all Great Lakes waters under the jurisdiction of the State of Michigan for the 6-year period.

In addition to the statistical studies reports dealing with the life history and racial affinities of the several species of pike-perches have been completed. The remainder of the investigative program includes the preparation of seven reports covering major investigations completed in the field during the past several years.

POLLUTION INVESTIGATIONS

The growing menace of pollution in the fresh waters of the United States by erosion and by municipal and industrial wastes has been accepted by many as inevitable because the basic facts—chemical, physical, and biological—concerning stream pollution generally have not been available. The menace is spreading not only throughout the various river systems but into the impounded waters as well, and threatens at various points the waters of the public domain and of the national playgrounds. Consequently remedial and corrective measures compatible with the interest of fisheries and with economic necessities have not been easy to define.

To meet this situation the Bureau of Fisheries has been conducting for some time investigations to ascertain (1) the natural conditions favorable for fish and other aquatic life in unpolluted waters, so that a polluted stream can be defined with fairness to all concerned; (2) the specific effects on fish and other aquatic life, and on the aquatic environment itself, of the various types of effluents which are being released into the fresh waters of the United States.

Much effort has been given to devising suitable tests that could be applied practically in the field in order to determine the extent of stream pollution. A set of water standards has been defined based upon the results of thousands of tests and analyses made in all of the major river systems of the United States. From these studies it has been possible to make definite recommendations for practical remedial measures in various cases of stream pollution; and a comprehensive report embodying the findings of this investigation has been completed for early publication.

AQUICULTURAL INVESTIGATIONS

Researches in the field of aquiculture, or water farming, as applied to food and game fish in interior waters are intended to increase the efficiency of hatchery practices by stopping the loss from hatchery diseases; by greater economy in operation through the development of less expensive and more effective diets; by the rearing of fish to larger sizes so that they are better able to survive after planting; by the selective breeding of superior stocks of fishes with more rapid growth, greater egg production, and increased resistance to disease; by environmental control to improve the productive capacity of streams and lakes; and by the development of a more effective policy of stocking to assure the best distribution of the hatchery products in waters where the highest survival can be expected and the planting of fish in proper numbers and in proper localities to assure the greatest supply. In previous years research has been directed primarily toward proper hatchery technique and combating diseases; but during the past year great emphasis was placed on field studies since it is impossible to use the production of our hatcheries to the best advantage until we learn more about the various factors that affect fish in natural waters. Our lack of information of these fundamental factors is the greatest obstacle at present in developing a scientific policy of fish management.

In pond-fish culture for bass and other warm-water fishes conducted on the basis of natural food production in ponds, previous experiments have determined the most satisfactory fertilizers to maintain food production. During the past year the quantities of fertilizers and the periods that reveal the limitations of productive capacity of the ponds and the maximum fish production have been determined.

More elaborate studies have been conducted on trout culture. Feeding experiments conducted at two of the Bureau's experimental hatcheries have involved the testing of various artificially prepared commercial diets and the substitution of cheaper foods for the standard diet of beef liver. Detailed researches conducted in cooperation with the State of New York and Cornell University have been developed along three lines: (1) continuation of the study of growth of four species of trout fed similar diets and maintained under similar conditions to determine the efficiency of food utilization; (2) the determination of the amount of food required per unit of weight to obtain the most economical production; and (3) chemical balance studies to determine the amount of phosphorus and calcium needed by growing trout.

Selective breeding studies have been conducted; and in addition to increased rate of growth and higher disease resistance previously developed, a strain of trout has been selected with high egg production and higher fertility of eggs.

As in previous years, the study of fish diseases was largely confined to investigations of epidemics in hatcheries and the development of better methods of control. The establishment of a pathological laboratory at Seattle, Wash., has made it possible to devote more attention to the diseases prevalent in the Intermountain region and the Pacific Coast States. Additional information regarding the causes and control of two relatively new diseases has been obtained; and a free clinic or disease service has been established and greatly expanded during the year for the examination of specimens of diseased fish sent in by hatchery superintendents for diagnosis, and for the furnishing of advice for treatment and prophylaxis.

SHELLFISH INVESTIGATIONS

The scope of shellfish investigations previously conducted by the Bureau was greatly enlarged last year by the special appropriation of $100,000 for the study of oyster pests and the development of practical methods for their control in the Atlantic and Gulf States. In addition limited investigations of oyster and hard clam culture were continued in the waters of New England, the South Atlantic States and in Puget Sound. A special allotment of $20,000 was provided by the Public Works Administration for studies of the failure of oyster culture in York River, Va., allegedly caused by pulp mill wastes. All of this work has been carried out by the regular staff of the Bureau augmented by 20 temporary investigators and 50 assistants whose period of employment varied from 3 to 9 months. Excellent cooperation was received from the various States, the Works Progress Administration, and the Transient Rehabilitation Camps which supplied about 110 relief laborers for the field investigations.

The oyster pest investigation was directed toward the control of three major organisms destructive of oysters: (1) the starfish infesting the waters of New England and the North Atlantic States; (2) the drill in the Delaware and lower Chesapeake Bays and extending as far south as Texas; and (3) the so-called "leech", the recent outbreak of which has destroyed extensive areas of oyster-producing bottoms in Florida. The problems of the destruction of oysters caused by the boring sponge and the conch, although of lesser importance, were also included in the project. Practical methods that can be used by the oyster industry for the control of these pests must be based on a thorough knowledge of their life histories and an understanding of their habits and activities.

Oyster pest investigations were also undertaken in the inshore waters of Florida, Alabama, and Texas. Previous surveys showed that the most destructive pests of this section are the borer and the "leech" or flat worm. Other pests associated with these, but whose relations as commensals or enemies are undetermined, are the boring sponge, boring clam, barnacles, and mussels.

During the summer of 1935 the oyster bottoms of the Texas coast were surveyed to discover the kinds and numbers of oyster pests present and to devise methods of control. Approximately 800 miles of coast line were examined between Corpus Christi Bay and Galveston Bay, examinations being made of commercial reefs to determine the condition of oysters, salinity, temperature, character of the bottom, and abundance of oyster pests. The most common organism infesting oysters is the boring clam. The borer, the common conch, and the boring sponge are also present in moderate numbers. In addition to pests, however, it was found that the greatest danger to oyster beds in this section is from occasional floods from the rivers of the coastal plain. Recommendations were offered to assist oyster growers in meeting these conditions and in managing their holdings.

Because of the increased activity in connection with the oyster pest control investigations, the regular studies for improving and promoting oyster culture were greatly curtailed. A study of the seasonal changes in the mineral content of oyster meats and its relations to environmental changes was conducted and completed during the year. In Long Island Sound variations in the quantities of copper, iron, zinc, and manganese of great nutritional and therapeutic value in the human diet were traced to aid in the producing and marketing of oysters of standard quality. Technical direction was also afforded to State officers in Alabama and the Works Progress Administration in their project of developing oyster-producing grounds.

On the Pacific coast a 5-year study of problems concerned in the cultivation of Olympia oysters in Puget Sound was brought to a conclusion. The purpose of this investigation was to determine factors influencing the spawning and setting of Olympia oysters in order to develop a system whereby oyster growers can be assured annually of an abundant supply of seed. Spawning habits, life and attachment of the larvae, and the relations of spawning to physical conditions have been thoroughly investigated, with the result that practical guidance has been afforded the oyster growers in planting cultch at the proper time in relation to tidal cycles to assure an abundance of seed oysters.

As previously noted, an investigation was started at Yorktown, Va., to determine the effects, if any, of pulp mill wastes discharged in the York River on the oysters of this region. Formerly a productive ground noted for oysters of superior quality, production in the York River has in recent years dwindled alarmingly and oysters produced have been very poor quality. Preliminary experiments show that the effluent from the pulp mill is not sufficiently toxic to kill the oysters immediately, nor apparently is it responsible for a reduction in the quantity of plankton food available. Whether it exerts an influence interfering with the nutrition of the oyster or whether other physiological processes are involved will require careful experimentation; and, if it is found that wastes from the sulphate pulp process are harmful, corrective measures must be found. The work had not progressed far enough at the close of the year to afford positive evidence of these obscure points.

In addition to studies of oyster culture, investigations of the life cycle of the quahog clam were carried on at the experimental field laboratory at Milford, Conn. Spawning, growth, feeding, reactions to temperature and water salinity have been determined as a foundation for more practical studies on artificial propagation and farming of clams in the New England region.

BLACK BASS AND ANGLERS DIVISION

Evidence of violations of the black-bass law was obtained in a number of cases, three of which were referred to the Solicitor for prosecution in Federal court. Seizures of black bass illegally transported interstate were made in a number of instances. Information showing violations of State laws was obtained in a number of investigations and turned over to the State authorities for attention.

While only a small number of State legislatures (11) met in regular session in 1936, some progress in black-bass legislation was made. There are still, however, seven States where there is no closed season on black bas, six States where black bass may be sold if imported from other States, and four States where the sale is restricted only during short periods of the year or from certain waters. Thirty-eight States now absolutely prohibit the sale of black bass at all times regardless of where they have been taken.

Among the advances made in State legislation during the fiscal year 1936, either by legislative enactment or regulation, may be mentioned the fact that four States adopted the part-time angler's license, two States reduced their daily limits, and three increased protection by lengthening the closed season. These improvements are in line with the Bureau's policies.

Generally speaking, black-bass protection materially advanced during the year. From reports received from deputy black-bass law inspectors and others it is believed black bass have increased in the past year, and fishing at the close of the fiscal year was much improved, excepting in those waters affected by drought.

Several of the Division's publications were revised. They cover such subjects as enforcement, books on angling, how, when, and where to fish, list of State officials, and tourist's licenses. Requests for information on these subjects reached the Division in ever-increasing numbers. More persons are interested in angling than ever before; the last tabulation by the Bureau of the number of anglers licenses issued by the States showed an increase of 265,375 over the previous issue.

Fishery Circular No. 20, containing the Federal black-bass law, and a synopsis of the State laws, published the first part of the fiscal year, was exhausted during the close of the year necessitating an early publication of a new issue which will be revised to include the latest changes.

LIBRARY

The library of the Bureau, although housed with the Department of Commerce Library, is maintained as a separate unit by the Bureau. It is one of the finest collections of scientific works concerning the fisheries in the world. As such it attracts attention from students and scientists all over the country, and many foreign scientists avail themselves of its services. The Bureau's staff, of course, finds it invaluable as it serves both the Washington office and the field force.

The library at present consists of 43,036 volumes, 1,500 pamphlets, and 199 monthly periodicals.

AQUARIUM

The past 12 months proved most conclusively the popularity of the aquarium located under the main lobby of the Department of Commerce Building. This consists of 50 aquaria and 3 center pools. The outstanding individual exhibit, maintained during the winter until late spring, was a miniature hatchery demonstration. Eggs of Lake Erie whitefish, Potomac River yellow perch and shad, brook trout, rainbow trout, and silver salmon were hatched. Biology classes visited the exhibit frequently to observe the progress of development.

Specimens and eggs were also supplied to other public aquaria as a means of mutual cooperation. Experimental work on the efficacy of permanganate of potash, in treatment of parasites and bacteria in aquaria, is proving effective.

The aquarium population varies in season, averaging about 55 species and 1,480 individuals during 1936.

VESSELS

Fifteen vessels of the Alaska service cruised about 120,000 nautical miles in the fiscal year 1936, as compared with 118,000 miles by 13 vessels in the preceding year. The *Penguin* logged the greatest distance, with approximately 27,000 miles. The *Brant* covered about 14,500 miles, the *Eider* 11,000 miles, and the *Crane*, *Teal*, and *Scoter* each about 10,000 miles.

The *Penguin* made five round-trip voyages between Seattle and the Pribilof Islands, transporting personnel and emergency supplies. Inter-island service also was performed, and native workmen from the Alaska Peninsula were transported to the Pribilof Islands to assist with the season's sealing activities.

The *Auklet*, *Kittiwake*, *Merganser*, *Scoter*, and *Widgeon* were engaged in fishery protective work in southeast Alaska during the 1935 season. The *Murre* operated in the Seward-Katalla district, and the *Eider* in the Kodiak area. The *Teal* was on Cook Inlet until the end of August and then was transferred to southeast Alaska for the fall patrol. The *Ibis* was at Chignik, the *Crane* and *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River. The *Blue Wing* patrolled the Bristol Bay area until the latter part of July, after which it was on duty in the Kodiak area.

The *Brant* was used for general supervisory work, cruising as far as the Pribilof Islands in Bering Sea, and also assisted with the patrol and survey of salmon-spawning streams in southeast Alaska.

In the spring of 1936 the *Brant* and *Crane* assisted with the fur-seal patrol in the vicinity of Neah Bay, Wash., and the *Kittiwake* performed similar duty near Sitka, Alaska. The last-named vessel was used also in herring-tagging operations. From February to April 1936 the *Eider* was assigned to the Works Progress Administration project of stream improvement in southeast Alaska.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated $1,565,920 as follows:

Salaries, Commissioner's office	$156, 420
Propagation of food fishes	667, 000
Maintenance of vessels	160, 000
Inquiry respecting food fishes	172, 000
Fishery industries	62, 000
Protecting seal and salmon fisheries of Alaska	278, 000
Upper Mississippi Wild Life and Fish Refuge	18, 000
Enforcement of black-bass law	15, 000
Fisheries Cooperative Marketing Act	12, 500
Shellfisheries investigation	25, 000
Total	1, 565, 920

U. S. GOVERNMENT PRINTING OFFICE: 1937

ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1935[1]

By WARD T. BOWER, *Chief, Division of Alaska Fisheries*

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[1] Administrative Report No. 23, Appendix I to the Report of the U. S. Commissioner of Fisheries for 1936. Approved for publication, June 5, 1936.

INTRODUCTION

The conservation of the fisheries of Alaska by means of protective regulations and the management of the Pribilof Islands fur-seal herd are among the major duties of the Bureau. This work in 1935 was continued along the same general plan as in previous years. The Commissioner and Deputy Commissioner of Fisheries each spent several weeks in the Territory during the summer for personal observation of fishery operations; activities at the Pribilof Islands also were observed.

Upon the basis of previous experience several changes were made in the fishery regulations, the most important of which was that curtailing the fishing season in Bristol Bay, where a small run of salmon was anticipated.

The total pack of salmon in Alaska compared favorably with the average production of recent years. The small pack of red salmon, occasioned by poor runs in the Bristol Bay, Alaska Peninsula, and Chignik areas and by fishermen's strikes in the Copper River area, was offset to some extent by a large pack of pink salmon in southeast Alaska.

In the patrol of the fishing grounds 14 Bureau vessels and 3 chartered boats were used, and 170 temporary employees were engaged for varying periods. Chartered airplanes were used effectively in this work and also in making surveys of the spawning grounds after the close of commercial fishing.

Scientific studies of salmon and herring were continued in cooperation with the Division of Scientific Inquiry during the year. Attention was given to the routes of migration of salmon in Clarence Strait as indicated by tagging operations. Herring also were tagged to trace their movements and to determine the degree of interdependence of the various populations in southeast Alaska.

In connection with some of the biological work, and to determine the relation between the catch and escapement of salmon, 11 weirs were operated in typical streams, through which all ascending salmon were counted. At several weirs predatory trout were destroyed, and in Bristol Bay a program of trout control was started on a larger scale with funds allotted by the Works Progress Administration.

At the Pribilof Islands 57,296 fur-seal skins were taken, an increase of 3,826 over the number taken in 1934. Killings were confined as far as possible to 3-year-old males, and a sufficient number of such animals was reserved for breeding purposes. The census of the herd as of August 10, 1935, showed 1,550,913 animals of all classes, an increase of 120,495 over the corresponding figures for the previous year. During the winter of 1935–36, 1,019 blue and 15 white fox skins were taken from the herds at the islands.

Work was completed on the new schoolhouse at St. George Island during the year, and minor improvements were made to other structures. Roads on both islands were extended and improved to facilitate fur-seal operations.

The byproducts plant at St. Paul Island was put into operation for the first time since it was modernized in 1931, and although its efficiency was somewhat hindered by the long idleness, there was a substantial production of meal and oil.

The Navy Department cooperated with the Bureau in detailing the U. S. S. *Sirius* to transport the annual shipment of supplies to the Pribilof Islands and to bring out the sealskins taken during the season. Valuable assistance was rendered also by the United States Coast Guard in maintaining a patrol for the protection of the fur seals.

Acknowledgment is made of the assistance rendered by members of the Bureau's staff in the preparation of this document.

VISIT OF THE COMMISSIONER OF FISHERIES AND OTHER OFFICIALS TO ALASKA

The Commissioner of Fisheries left Washington on July 22 for his annual trip of inspection of the Alaska fisheries. He sailed from Seattle on the *Brant* on July 28 and arrived at Cordova on August 8, after having stopped en route at various points in southeast Alaska. From Cordova a trip was made by airplane to Anchorage and the Matanuska colony. Fairbanks also was visited. Some additional airplane travel in southeast Alaska expedited the work in that district, and Commissioner Bell returned to Seattle on August 22.

Congressman C. Elmer Dietrich, of the House Committee on Territories, accompanied Commissioner Bell on the above trip. Besides making personal observations of conditions, he took a series of motion pictures of typical Alaska scenes, including salmon fishing and canning operations, and the new colony at Matanuska.

Earlier in the season Deputy Commissioner Charles E. Jackson made an extensive inspection of the Bureau's work in Alaska. Departure from Seattle was made on the *Brant* on June 1, and during the next few weeks all important fishing districts of the Territory were visited. On July 2 and 3 Mr. Jackson was at the Pribilof Islands to observe the fur-seal activities. He returned to Seattle on July 16.

WORKS PROGRESS ADMINISTRATION

An allotment of $55,996 for special work in Alaska under the direction of the Bureau of Fisheries was made by the Works Progress Administration from funds available under the Emergency Relief Appropriation Act of 1935. Of this amount, $24,600 was designated for the improvement of salmon-spawning streams in southeast and central Alaska, and $31,396 for repairing the marine ways at Naknek and destroying predatory enemies of salmon in the Bristol Bay region.

Special permission was granted for employing persons from relief rolls on a piece-work basis in the destruction of predatory fish that feed upon salmon eggs and fry in the Bristol Bay region, and the work there was begun in October 1935 and continued throughout the winter. The program for improving natural salmon-propagation conditions in southeast and central Alaska was not undertaken before the end of the year, as the funds were not available until fall, when the presence of spawning salmon and approaching winter conditions made it necessary to postpone the stream-clearing work.

FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects of special investigation or inquiry.

EXECUTIVE ORDERS

The site at Yes Bay that had been reserved for a salmon hatchery in 1906 was restored to public entry by Executive order of May 31, 1935, as follows:

> The Executive order of February 1, 1906, reserving and setting apart the following-described land and water areas in Alaska as a site for a salmon hatchery is hereby revoked, and the said areas are hereby declared to be a part of the Tongass National Forest as established by proclamation of February 16, 1909 (35 Stat. 2226):
>
> Yes Lake (otherwise known as Lake McDonald) and its catchment basin, its outlet, and a strip of land one-eighth of a mile along each shore thereof; Yes Bay, Back Bay, and a strip of land one-eighth of a mile wide along the shores thereof and a strip of land one-eighth of a mile wide on each side of the old Indian trail.

Under date of October 24, 1935, an Executive order was issued designating Coast Guard vessels to assist in the patrol to enforce the provisions of the Northern Pacific Halibut Act. The text of the order is as follows:

> By virtue of and pursuant to the authority vested in me by section 7 of the Northern Pacific Halibut Act (47 Stat. 142), I hereby designate such vessels of the Coast Guard as the Commandant of the Coast Guard shall assign for the purpose to patrol the territorial waters of the United States, as defined in the said act, for the enforcement of the said act and the Convention for the Preservation of the Halibut Fisheries of the Northern Pacific Ocean and the Bering Sea.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued January 19, 1935, were amended by the following regulations issued by the Secretary of Commerce under the dates indicated:

[*June 26, 1935*]

Alaska Peninsula Area

Salmon fishery.—Regulation No. 5 is amended so as to prohibit operation of any purse seine within 1,500 feet of any trap.

Southeastern Alaska Area

WESTERN DISTRICT

Salmon fishery.—1. Regulation No. 20 (*l*) is amended to read as follows: Admiralty Island: West coast (1) from 57 degrees 38 minutes north latitide to 57 degrees 39 minutes 15 seconds north latitude, (2) from 57 degrees 40 minutes 40 seconds north latitude to 57 degrees 45 minutes north latitude, (3) from 57 degrees 49 minutes 55 seconds north latitude to 57 degrees 51 minutes north latitude, (4) from 57 degrees 54 minutes 45 seconds north latitude to 57 degrees 56 minutes 20 seconds north latitude, and (5) from 57 degrees 57 minutes 50 seconds north latitude to 58 degrees 2 minutes north latitude.

2. Regulation No. 20 (*o*) is amended to read as follows: Admiralty Island: West Coast (1) from a point north of Wilson Cove at 57 degrees 10 minutes 30 seconds north latitude to 57 degrees 10 minutes 40 seconds north latitude, (2) within 2,500 feet of a point at 57 degrees 12 minutes north latitude, and (3) within 1,000 feet of a point at 57 degrees 13 minutes 50 seconds north latitude.

[*July 3, 1935*]

Bristol Bay Area

Salmon fishery.—1. Commercial fishing for salmon is prohibited except within the following-described districts:

(*a*) Hagemeister district: Waters of Hagemeister Strait from 161 degrees 40 minutes west longitude to 160 degrees 38 minutes west longtitude.

(*b*) Nushagak district: Waters of Nushagak Bay within a line from Point Protection to Etolin Point.

(*c*) Kvichak-Naknek district: Waters of Kvichak Bay within a line from Etolin Point to Middle Bluff Light on the eastern side of Kvichak Bay.

(*d*) Egegik district: Waters between an east and west line 8 statute miles north of South Spit, Egegik Bay, and an east and west line 10 statute miles south of South Spit.

2. Commercial fishing for salmon shall be conducted solely by drift gill nets, set or anchored gill nets, and stake gill nets. The use of all other forms of fishing gear is prohibited.

3. Each drift gill net in operation shall be marked by a cluster of floats or corks at the ends, and double floats or corks shall be attached to the cork line at 25-fathom intervals. The clusters of floats or corks at the ends and the double floats or corks at the 25-fathom intervals shall be painted bright red and legibly and plainly marked with the initials of the operator.

4. Stake nets and set or anchored gill nets shall be operated in substantially a straight line.

5. Commercial fishing for salmon with stake nets or set or anchored gill nets shall be limited to beach areas between high and low water marks and shall be confined to the following places:

(*a*) Nushagak district: Along the beach, except on the west side of Nushagak Bay from a point 2 statute miles south of Bradford Point to Coffee Point, and except along the east side of that bay from the northern end of Ekuk Bluff to Etolin Point.

(*b*) Kvichak Bay: Along the beach on the southeast shore of the bay from Prosper Creek to Coffee Creek.

(*c*) Naknek Bay: Along the beach on each side of the bay to a point 1,200 yards above the drift gill net prohibitive markers and to a point 1,500 yards outside such markers.

(*d*) Egegik Bay: Along the beach on the north side of the bay to a point 2,000 yards outside the drift gill net prohibitive marker and on the south side of the bay to a point 5,000 yards outside such marker.

6. The combined take of red salmon for commercial purposes in the Hagemeister district shall not exceed 50,000 fish in any calendar year.

7. The total aggregate length of stake nets used by any individual shall not exceed 50 fathoms measured on the cork line.

8. The total aggregate length of gill nets on any salmon fishing boat, or in use by such boat, shall not exceed 150 fathoms hung measure.

9. King-salmon nets shall have a mesh of at least 8½ inches stretched measure between knots, and red-salmon nets shall have a mesh of at least 5½ inches stretched measure between knots as measured when actually in use. No red-salmon nets shall be over 28 meshes deep.

10. Commercial fishing for salmon is prohibited prior to 6 o'clock antemeridian July 4.

11. Commercial fishing for salmon is prohibited in the period from 6 o'clock antemeridian July 25 to 6 o'clock antemeridian August 3.

12. The trailing of web behind any fishing boat is prohibited above the markers fixing closed waters.

13. The use of motor-propelled fishing boats in catching salmon is prohibited.

14. Each salmon-fishing boat in operation shall be legibly and plainly marked with the initials or symbol of the person, company, or corporation owning, operating, or using same, together with a distinctive number which shall identify each particular boat, said letters, symbols, and numbers to be not less than 6 inches in length. Each person, company, or corporation operating two or more salmon-fishing boats shall have said boats numbered consecutively, beginning with number 1 for each plant. Boats operated by Alaska residents shall have in addition the letter "A" before the number. Each season, prior to the opening date for commercial fishing, the initials or symbol, and number of each boat shall be furnished in writing to the agent of the Bureau of Fisheries in charge of the district in which said boat shall operate.

15. The use of smelt nets is prohibited in localities where young salmon are migrating.

16. The 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian Tuesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 72 hours: *Provided*, That in the waters of Kvichak Bay between the line extending across the bay from the marker on a high point on the east bank of Prosper Creek, about 700 yards above the Koggiung cannery of the Alaska Packers Association, to the marker on the opposite side, the course being about north, 44 degrees west, magnetic, and the line extending across the bay from a marker at Jensen Creek, the course being north, 54 degrees west, magnetic, to a marker on the opposite shore about 1½ miles west of Squaw Creek, the 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian of Saturday of each week to 6 o'clock antemeridian of the Tuesday following and the period from 6 o'clock postmeridian Tuesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 96 hours.

17. All commercial fishing for salmon is prohibited as follows:

(*a*) Nushagak Bay: All waters northward of a line from a marker 2 statute miles below Bradford Point to a marker on the opposite shore at Nushagak Point: *Provided*, That stake nets or set or anchored gill nets limited to beach areas between high and low watermarks will be permitted to the old prohibitive line from Snag Point to the old village on the east bank.

(*b*) Kvichak Bay: All waters above a line extending at right angles across Kvichak Bay from the marker on a high point on the east bank of Prosper Creek, about 700 yards above the Koggiung cannery of the Alaska Packers Association, to the marker on the opposite side, the course being about north, 44 degrees west, magnetic.

(*c*) Naknek Bay: All waters within 1 statute mile of the mouth of the Naknek River: *Provided*, That stake nets or set or anchored gill nets limited to beach areas between high and low watermarks will be permitted on each side of the bay to a point 1,200 yards above the drift gill net prohibitive markers as well as to a point 1,500 yards outside such markers.

(*d*) Egegik Bay: All waters above a line extending at right angles across said bay from a marker on the north bank 250 yards east of Libby, McNeill & Libby's cannery building to a marker on the south bank 175 yards east of the Alaska Packers Association's new cannery building.

[*July 12, 1935*]

BRISTOL BAY AREA

Salmon fishery.—In addition to existing prohibitions, commercial fishing for salmon in the Nushagak district, which embraces the waters of Nushagak Bay within a line from Point Protection to Etolin Point, is prohibited from 6 o'clock antemeridian to 6 o'clock postmeridian of Tuesday of each week, and from 6 o'clock postmeridian Friday to 6 o'clock postmeridian Saturday of each week.

[*September 14, 1935*]

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year: *Provided*, That this prohibition shall not apply to Glacier Bay, Excursion Inlet, and Port Frederick from September 23 to October 5, both dates inclusive.

WESTERN DISTRICT

Salmon fishery.—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year: *Provided*, That this prohibition shall not apply (1) to the use of purse seines in Hood Bay and Chaik Bay from September 23 to October 5, both dates inclusive, and (2) to the use of gill nets in Lynn Canal waters south of a line across Chilkat Inlet from Anchorage Point to the light on the opposite shore and south of a line across Chilkoot Inlet from Low Point light to Tanani Point, from September 16 to September 30, both dates inclusive.

EASTERN DISTRICT

Salmon fishery.—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year: *Provided*, That this prohibition shall not apply (1) to the use of purse seines in Security Bay and Port Camden from September 23 to October 5, both dates inclusive, and (2) to the use of drift gill nets in Taku Inlet through September 30.

SUMNER STRAIT DISTRICT

Salmon fishery.—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year.

SOUTHERN DISTRICT

Salmon fishery.—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year.

Revised regulations effective in 1936 for the protection of the fisheries of Alaska were issued by the Acting Secretary of Commerce under date of February 8, 1936, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D. C.

ANNETTE ISLAND FISHERY RESERVE

The Annette Island Canning Co. operated in the Annette Island Fishery Reserve, as in the previous year, under its lease from the Department of the Interior.

Eight traps operated by the company in the reservation caught a total of 964,741 salmon in 1935, and 48,552 salmon taken by seines were purchased from the natives. In addition, 823,063 salmon were purchased from independent operators of traps and seines outside the reserve. Of this number, 1,655 were sold to another company and the remainder were packed at the cannery. In the operation of the plant and the fish traps employment was given to 29 whites and 181 natives.

Profits to the Metlakatlan Indians of the reserve on the cannery operations for 1934 under the provisions of the lease amounted to $51,570.60. Preliminary estimates for the year 1935 place the figure at about $55,000.

CULTURE OF JAPANESE OYSTERS

Japanese oysters, first introduced in the Puget Sound region, are now being raised on a commercial scale from California to British Columbia, and recent experiments indicate that the northern range of this industry may soon be extended to Alaska. The first reported planting of Japanese oysters in Alaskan waters was by B. E. Smith of Ketchikan in 1931, when 40 bushels of cull oysters from Puget Sound were distributed in certain bays south of Ketchikan. In the following 2 years he planted approximately 700,000 Japanese seed oysters, and in 1935 about 1,000,000 seed oysters were planted. The oysters are reported to have made a healthy growth in all instances, and a limited number have been marketed.

Other smaller plantings of Japanese oysters have been made by Al Weathers near Juneau, and by A. S. Day near Valdez, in central Alaska, and satisfactory results have been reported.

The expansion of this potential industry beyond the successful experimental stage already reached depends upon the modification of existing laws or the adoption of methods which will permit the growers to maintain title to their crop.

STREAM IMPROVEMENT

No special program of stream improvement was carried on in 1935, but wherever possible in connection with their regular patrol duties stream guards removed log jams and other obstructions that blocked the passage of salmon to the spawning grounds, and in some places they cut trails through the brush to facilitate examination of the beds at the close of the season.

The destruction of Dolly Varden trout that feed on salmon eggs and fry was carried on in several localities under special allotments of Government funds and contributions from local salmon packers. In the Bristol Bay district a bounty of 2½ cents was paid, as in previous years, on predatory trout taken by bona fide residents of Alaska, funds for the purpose having been provided by the Territorial Legislature and by Bristol Bay packers. These bounties amount to approximately $15,000 annually. In the fall of 1935 an additional fund for Dolly Varden trout control in this district was created by the Works Progress Administration as a relief measure, thus making possible more extended operations throughout the winter. Special wardens of the Bureau had charge of counting all the trout that were taken and preparing the necessary vouchers.

Further work in the control of predatory trout was carried on in the Yakutat and Cook Inlet districts, where contributions of $1,000 and $3,200, respectively, were made by local packers. During the year 31,012 Dolly Vardens were destroyed in the Yakutat district and 208,799 in the Cook Inlet district. Weir crews in the Kodiak district operated traps and other gear for the capture of predatory trout and took 70,000 in Red River and 32,160 near the cannery station weir on Olga Bay.

STREAM MARKING

New markers defining areas closed to commercial fishing were erected to replace those which had become illegible or damaged, and changes were made in the positions of others to conform with changes made in the regulations with respect to closed areas.

STREAM GUARDS

The Bureau employed 170 men in 1935 as stream guards, weir operators, and special workmen in connection with law-enforcement duties. Of these, 82 were stationed in southeast Alaska, 60 in central, and 28 in western Alaska. Some of the workers were engaged for only a few days, but the average period of employment ranged from 2 to 5 months.

In southeast Alaska 35 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 12 guards were stationed in the Seward-Katalla district, 11 on Cook Inlet, 25 in the Kodiak-Afognak district, 4 at Chignik, and 8 in the Ikatan-Shumagin district. Five stream guards in the Seward-Katalla district furnished their own launches.

In western Alaska 24 were on Bristol Bay, and 4 in the Yukon-Kuskokwim district.

There were also eight special employees engaged in scientific work—two on herring and six on salmon investigations, this work being carried on in southeastern and central Alaska.

In addition, there were 12 statutory employees, 49 men on the Bureau's vessels, and 2 on the two chartered boats.

The foregoing makes a grand total of 241 persons identified with fishery protective work in Alaska in 1935, as compared with 237 in 1934.

VESSEL PATROL

Fourteen vessels of the Bureau were engaged in the Alaska fisheries patrol in 1935, and one, the *Petrel*, was out of commission at Seattle. The *Auklet*, *Kittiwake*, *Merganser*, *Scoter*, and *Widgeon* were used in southeast Alaska; the *Murre* was on Prince William Sound, the *Ibis* at Chignik, the *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River. The *Eider* operated chiefly in the Kodiak area, although the voyage from Seattle in May extended as far westward as False Pass in order to transport employees and supplies to various stations; on the return trip to Seattle in August transportation was afforded passengers from Kupreanof Harbor and other points.

The *Teal* was used in herring-tagging operations in southeast Alaska in the latter half of March and the first week of April, in the patrol of the Cook Inlet area from May 7 to August 22, and in the inspection of spawning areas and the patrol of fishing grounds in southeast Alaska in the fall. The *Blue Wing* patrolled the Bristol Bay region from the middle of May until July 28 and then was transferred to duty in the Kodiak district. As in the preceding year, the *Crane* patrolled the Alaska Peninsula area and transported Bureau employees of the Bristol Bay district at the beginning and end of the season. The *Brant* was used chiefly in general supervisory work from June to August, inclusive, visiting all fishing areas and the Pribilof Islands, and afterwards assisted in the stream examination and patrol of southeast Alaska until the latter part of October.

Both the *Brant* and the *Scoter* engaged in the fur-seal patrol during the spring migration of the herd, the former operating off Cape Flattery, with base at Neah Bay, from April 9 until May 11, and the latter in the vicinity of Sitka from April 20 to May 27.

A speed boat equipped with a 125-horsepower marine engine was operated in the vicinity of Juneau. Three 80-horsepower speed boats were also in use—1 on Bristol Bay, 1 on Prince William Sound, and 1 in the Wrangell district. The speed boat on Prince William Sound was destroyed by an explosion on July 27. Its engine was salvaged and has been reconditioned for use in a new boat that will be built to replace the one lost. There were 19 skiffs and dories equipped with outboard motors in operation by the Bureau—2 in southeast Alaska, 3 in the Seward-Katalla district, 4 on Cook Inlet, 5 in the Kodiak area, 1 at Chignik, and 4 in the Alaska Peninsula area.

In addition to the foregoing, a few boats were charted for patrolling the fishing grounds, as follows: The gas boat *Mars* in the Ketchikan district, the *Wingham* in the Seward-Katalla district, and the launch *Marie S* on the Kuskokwim River.

AERIAL PATROL

The use of airplanes under charter from commercial companies was again important in supplementing the vessel patrol of the fishing grounds in southeast Alaska and the Seward-Katalla district. Planes were used also to make inspections of some of the spawning grounds and to transport officials of the Bureau to isolated districts. During the 1935 season a total of 16,191 nautical miles was traveled in these activities, on 40 different days, the total flying time amounting to about 166 hours.

COMPLAINTS AND PROSECUTIONS

A trap of Libby, McNeill & Libby at Arucenas Point, Suemez Island, was found set for fishing on the morning of July 29 before the end of the weekly closed period. The case was tried before the United States Commissioner at Ketchikan and a fine of $750 was imposed, plus $5 to cover the cost of hiring a trap watchman, upon payment of which the trap was released to the owner.

Five purse-seine boats in southeast Alaska were seized for fishing in closed waters. Of these, the *Bluebird*, with a crew of four, was operating within 75 yards of the mouth of White River, George Inlet. The owner, captain, and one other man pleaded guilty in the Commissioner's court at Ketchikan and were fined $75 each. The fourth member of the crew pleaded not guilty, and on trial by jury he was acquitted. In the case of the *Kansas* and *Leba*, each with a crew of 5 natives, which operated in closed waters near the mouth of Calder Creek, fines of $298.94 and $325, respectively, were imposed, while the salmon aboard the vessels at the time of their seizure were sold for $101.06 and $292.55, and the proceeds were turned over to the Department of Justice. A fine of $325 was imposed on the crew of five natives on the *Nora*, found fishing inside the markers at the mouth of Klakas Creek. Two fox farmers using the seine boat *Lois W* were fined $50 each for fishing in Calder Creek.

Two operators of gill-net boats, found fishing inside the markers at Taku River, were given a 3-month suspended sentence. A 60-day suspended sentence was imposed on the operator of the gill-net boat *Raven* for fishing inside the markers at the mouth of Mill Creek, and the gear was confiscated. A case was brought in the Commissioner's court at Wrangell against another fisherman, found with wet seine and fish aboard his gill-net boat *T–1957* at the mouth of Mill Creek, but it was dismissed because of insufficient evidence.

Operators of the trolling boats *T–597* and *Judith* were arrested for fishing in a weekly closed period at a point 1¼ miles south of Point Rosary, Suemez Island. In the United States Commissioner's court at Craig the defendants were fined $200 and $150, respectively, whereupon they appealed to the United States district court. These cases were afterwards dismissed for lack of sufficient evidence.

A fine of $100 was imposed on the Alaska Pacific Salmon Co. for fishing with a gill net near Point Webster in waters not open to such apparatus. Two fishermen found operating beach seines in a closed season at the mouth of Petersburg Creek pleaded guilty before the United States Commissioner at Petersburg. One defendant was fined $50 and costs of $7.05 and his illegal catch was seized and sold for $30. The other was fined $100 and costs of $7.05 and was given a 30-day suspended sentence. A fine of $50 and a 90-day suspended sentence were imposed upon a fisherman who operated a purse seine as a beach seine in closed waters at the mouth of Barrie Creek, and a fine of $100 was assessed against a fisherman for using a beach net at the mouth of a salmon stream in Seclusion Harbor. Five fishermen in the Yakutat district were fined $10 each for setting a beach seine during a weekly closed period.

In the Seward-Katalla district three cases of illegal fishing for salmon in closed waters were tried before the Commissioner at Cordova. These cases involved four fishermen charged with operating two purse seines in Siwash Bay and three fishermen operating a purse seine within 500 yards of the mouth of a salmon stream in Eaglek Bay. Each fisherman was fined $25. A case against a fisherman found operating a purse seine in Galena Bay during a closed season was tried before the Commissioner at Valdez, and a fine of $50 was imposed. A clam digger was fined $10 for taking clams less than 4½ inches in total length of shell, the minimum size specified in the regulations. Another lot of undersized clams was weighed in at the cannery of W. R. Gilbert Co., but no digger claimed them. In both cases the clams were seized and sold and the proceeds were turned over to the Department of Justice. A fisherman charged with violating the law prohibiting aliens from fishing in Alaska waters was fined $100.

The case against the Copper River Packing Co., involving charges of illegal operation of three salmon traps after the close of the fishing season in 1934, was tried before the United States District Court of the Third Division of Alaska in the summer of 1935 and a fine of $500 was assessed.

Three cases of illegal fishing with gill nets during a weekly closed period were tried before the United States Commissioner at Anchorage. The four fishermen charged with the offense pleaded guilty and fines of $25 each were imposed, together with a 3-month suspended sentence. A complaint was also filed with the Commissioner at Anchorage against a fisherman charged with setting gill nets during a weekly closed period between Moose Point and Point McManus on the east shore of Cook Inlet. This case, which was pending at the end of the year, has been dismissed with a reprimand.

Three cases, also, were brought before the Commissioner at Seldovia. In one of these, two fishermen charged with operating a beach seine in Kamishak Bay before the fishing season opened were given a 3-month suspended sentence. Another case had to do with the operation of a beach seine by two fishermen inside the markers at the mouth of McNeill Creek. The men were fined $20 each and given a 3-month suspended sentence. The third case involved five men found fishing for the Puget & Alaska Canning Co. with two beach seines inside the markers at the mouths of salmon streams at the head of the west arm of Port Dick. Fines of $25 each were imposed on the fishermen and $100 on the company, upon payment of which, the boats and apparatus were released. The proceeds from the sale of salmon seized from the last-mentioned operators, amounting to $43.07, were turned over to the Department of Justice.

In the Chignik area two set gill nets belonging to Harry W. Crosby were observed fishing shortly after the beginning of a weekly closed period in July. No seizure of gear was made as the ebbing tide prevented the Bureau's patrol vessel from reaching shore. The case, however, has been dropped because of insufficient evidence.

TERRITORIAL FISHERY LEGISLATION

The Alaska Legislature, at its biennial session in 1935, passed an act providing for the annual licensing of all persons engaged in taking clams for commercial use, fixing the fee for such licenses at $1 for each resident and $15 for each nonresident clam digger, said fees to be paid by the cannery, food market, or other commercial enterprise on the clam diggers it hires or from whom it buys, and prescribing penalty of not more than 6 months in jail, $500 fine, or both, for hiring, or buying from, a clam digger without a license.

Another act, designed to promote more intelligent and orderly marketing of agricultural and aquatic products, provides for the organization and operation of cooperative associations to be termed "Cooperative marketing associations" and defines their powers.

A further act, pertaining to the fishery as well as other natural resources, creates an Alaskan planning council to make inquiries, investigations, and surveys concerning the resources of all sections of the Territory, to assemble and analyze the data, to formulate plans, and to make recommendations as to the best methods of conservation, utilization, and development of resources, and to cooperate with public agencies in such planning, conservation, utilization, and development of resources.

Three acts pertained to the payment of bounty on hair seals, which destroy salmon and other fishes in certain localities. One of these acts extended the region in which the bounty of $2 on hair seals is applicable; one provided funds in the sum of $7,500 for payment of deficiencies in the appropriation for the biennium ending March 31, 1935, for payment of such bounty; and the third appropriated $30,000 for the payment of the bounty in the succeeding biennium. The last-named act also appropriated $15,000 for clearing salmon streams and destroying predatory trout.

TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the general revenue law of 1921, as amended in subsequent sessions of the Territorial Legislature. A statement from Oscar G. Olson, Territorial treasurer, under date of May 9, 1936, gives the collections made to that date for the year 1935. It was stated that collections under the several schedules were fairly complete, although a number of the fisheries companies had not yet made full settlement. The outstanding salmon pack taxes amounted to approximately $125,000.

Fishery license taxes collected by Territory for fiscal year ended December 31, 1935

Schedule	Division no. 1	Division no. 2	Division no. 3	Total
Salmon canneries (pack)	$212, 174. 28		$600, 273. 28	$812, 447. 56
Clam canneries	1. 06		557 04	558. 10
Salteries	1, 742. 21	$5. 97	1, 122. 72	2, 870. 90
Cold-storage plants	900. 00			900. 00
Fish-oil works and fertilizer and fish-meal plants	10, 063. 56		1, 088. 31	11, 151. 87
Whale oil and fertilizer stations			9, 549. 00	9, 549. 00
Fish traps	81, 678. 66		49, 981. 23	131, 659. 89
Gill nets	369. 00	6. 00	226. 00	601. 00
Seines	5, 675. 00		2, 840. 00	8, 515. 00
Total	312, 603. 77	11. 97	665, 637. 58	978, 253. 32
Salmon canneries (net income), not possible of segregation as to judicial division				27, 612. 85
Total collections				1, 005, 866. 17

WATER-POWER PROJECTS IN ALASKA

Applications for permits for water-power projects in Alaska are referred to the Bureau by the Federal Power Commission for report as to whether the development of the project would be detrimental to the fishing interests. When the proposed project affects a stream in which salmon spawn, investigations are made in order to determine what measures are necessary to prevent impairment of the runs of fish, and if appropriate protection is not otherwise assured the application is rejected.

In 1935, applications were made for water-power projects at the following places: (1) a small unnamed creek flowing into the northeast arm of Uganik Bay on the west side of Kodiak Island; (2) a small unnamed creek on the north shore of Hood Bay on Admiralty Island; (3) Lost Creek and Upper and Lower Lost Lakes, north of Seward; (4) a small unnamed lake on Sitkalidak Island; (5) an unnamed creek on the north shore of Washington Bay, Kuiu Island. The last-mentioned application referred to a project which had been constructed and operating in trespass for about 17 years. As none of the streams concerned were used by spawning salmon, the Bureau made no objection to the utilization of the waters for power development.

KUSKOKWIM RIVER

A patrol of the Kuskokwim River district was again maintained by Stream Guard Charles McGonagall, with a chartered launch. Two outfits fished near the mouth of the river for export from Alaska—that of Robert Gherkie and the floating plant *Anvil* of the Davis Fisheries, Inc. The entire output consisted of 12 tierces of mild-cured king salmon, 448 barrels of pickled kings, and 244 barrels of pickled cohos.

Three hundred and forty-one natives fished in the river for local food requirements, using 395 gill nets of 6,820 fathoms, 50 wheels, and a number of small boats. They prepared 369 tons of dried chums.

YUKON RIVER

Commercial operations at the Yukon River were carried on by three operators—Frank Kern and the Northern Commercial Co., who fished with gill nets outside the mouth, and the Akularak Mission, which used fish wheels about 30 miles up the river from the head of Sunshine Bay. Very light catches were made, however, and the total production for the outside market was but 131 tierces of mild-cured and 48 barrels of pickled king salmon. As good catches for local use were taken farther up the river in most places, the unusual scarcity at the mouth could be explained only by the fact that the fish, when they began to come in after having been held offshore late by the ice, kept to the main channel and deep water, and so escaped the nets.

The first king salmon were taken at the mouth of the river on June 11, and the peak of the run was from June 18 to June 27. The run of chums started at the same time as the kings and continued good to July 20.

Inspector C. F. Townsend and a stream guard aboard the *Coot* again patrolled the district. The vessel left the Government ways at Nenana on May 29 for the mouth of the river and returned there on September 14.

Products of the Yukon and Tanana fisheries, including the commercial output, were as follows: 185 cases of kings canned, 131 tierces of mild-cured kings, 13,875 pounds of kings and 5,100 pounds of chums pickled, and 349 tons of dried chums. Apparatus consisted of 247 wheels, 109 gill nets of 1,699 fathoms, 3 motor vessels of 68 tons, 2 power dories, 6 gill-net boats, 3 scows, and miscellaneous small boats. There were 18 whites and 357 natives engaged in the fishery.

WEIRS FOR COUNTING SALMON ESCAPEMENT

Weirs for counting the escapement of salmon to the spawning grounds are operated in typical Alaska streams as a means of providing important information in connection with the salmon life-history studies and the regulation of the fisheries to assure a maximum yield. Of the 12 weirs that had been operated in the preceding year, all were reestablished and operated in 1935 except the one at Kaflia Bay. The Klawak weir in southeast Alaska, and the weirs at Chignik River, Chinik Creek, English Bay, Morzhovoi Bay, and Red River in the central district were installed under an allotment of funds from the Works Progress Administration that had been made available for the 1934 and 1935 seasons.

Reports of the weir operations and the counts of salmon in 1935 are as follows:

KLAWAK CREEK

The weir in Klawak Creek, at the same location as in previous years, was completed on May 28, and the first red salmon were counted through on the following day. Pink salmon began to appear on

July 28, but the numbers were negligible until August 6, after which they increased gradually until August 26, when 20,103 of this species passed through the weir. Before the end of the month the daily escapement dropped to about one-fifth of this number and continued fairly steady thereafter for nearly 4 weeks, except on September 19 and 20, when the daily tally showed 48,178 and 42,645 pink salmon, respectively. When operation of the weir was discontinued at the close of October 10, the total count numbered 425,180 pink salmon, 32,924 chums, 20,028 reds, and 6,955 cohos. It was estimated that there were then in the harbor at the mouth of the river 15,000 salmon, consisting mainly of pinks and chums in about equal numbers. Lloyd M. Johnson was the weir foreman, under the supervision of Warden Alexander P. Romine.

LITTLE PORT WALTER

Through the weir in the stream at the head of Little Port Walter, which is maintained primarily to supply information in connection with biological studies of pink salmon in southeast Alaska, 6,073 pink salmon were counted from August 12 to September 21, inclusive. About 250 pink salmon were in the stream below the weir when the structure was removed on September 22. S. J. Hutchinson carried on the weir operations at this place, under the direction of Dr. Frederick A. Davidson.

SITUK RIVER

Counting of salmon at the Situk River weir began on June 7 and was discontinued on August 10, when high water submerged the structure and washed it out at one end. The total count was 163,303 reds, 20,593 pinks, 632 kings, and 34 cohos. It was estimated that with the additional numbers passing upstream after the weir was removed the total escapement of red salmon for the season was at least 175,000. An extension of 24 hours to the weekly closed period was made on July 15 to assure the required escapement of at least 50 percent of the run. The reported commercial catch of red salmon for the season from the Situk River run was 151,768. Weir operations were under the supervision of Assistant Agent W. W. Kinsey.

ALITAK BAY

The cannery station weir on Olga Bay in the Alitak Bay region was completed on May 14, but it was not until May 27 that the first salmon passed upstream. Throughout the season the escapement was very irregular, which may be attributed, in part at least, to the fact that the stream was often very low. The highest count of red salmon for any one day was 17,799 on August 10, and the total count of reds for the week ending on that date was 25,550. The next highest weekly escapement was 14,656 red salmon in the week ending September 7. For the entire season the weir count numbered 85,025 red salmon, 5,662 cohos, and 640 pinks. There was still a large number of fish, chiefly cohos, in the lagoon at the time the weir was removed on September 12.

As in the previous year, no weir was maintained in the upper station stream, which harbors the largest run in the Olga Bay region. It was estimated that the escapement of red salmon there was 400,000. The run was light until the latter part of July, after which it increased and continued good until about the middle of September.

Predatory trout were taken from the cannery stream by means of a trap and seines, the total catch for the season being 32,160 Dolly Vardens.

Henry B. Looff was in charge of operations at this weir, under the supervision of Warden Charles P. Turner.

CHIGNIK RIVER

The weir in Chignik River was placed about 125 feet below the site occupied in the previous year. Favorable weather and a low stage of the water facilitated the construction work, which was begun on April 22 and completed a month later. From June 23 to June 28 a freshet raised the river 2 feet, causing the weir to sag, though not enough to allow the salmon to pass over the top.

The red-salmon run, which began on June 2, was light throughout the season and reached its peak on July 2, with an escapement of 17,207 for the day. When counting was discontinued on September 14 the total escapement numbered 640,118 red salmon, 39,252 cohos, and 1,950 kings. The total commercial catch of red salmon from the Chignik run was 539,543.

Warden Charles Petry was in charge of the Bureau's operations at this place.

CHINIK CREEK

Before installing the counting weir in Chinik Creek on June 8, the weir crew blasted the rocks to make a chain of five resting pools so that the salmon could more readily ascend to the spawning grounds. The first salmon passed upstream on June 18, and counting was continued until July 21, when the weir had to be taken out because of high water. The total count for the season was 16,036 red salmon, and it was estimated that between 4,000 and 5,000 ascended the stream after the weir was removed. Warden William B. Berry supervised the operation of this weir.

ENGLISH BAY

The weir in the creek at the head of English Bay was installed on May 2 and the first salmon passed through 10 days later. From May 12 to August 9 there were counted 15,851 red salmon. During the season 6,101 Dolly Varden trout were taken out of this stream with a trap. The work at this weir was under the direction of Warden William B. Berry.

KARLUK RIVER

At the time the Karluk weir was installed the river was comparatively high, but it dropped gradually and was at a very low level from the middle of June until early August. Although salmon were plentiful in the river mouth and the lagoon when the weir was completed on May 11, none passed upstream until May 22. A good run began on May 29 and continued heavy for a month, in which time nearly half the entire escapement for the season was tallied. The peak of this run was on June 8, when 60,346 red salmon were counted. Throughout July the run was very light, less than 12,000 red salmon passing through the weir. In the next 2 months conditions were materially improved, and there was a heavy run in the latter part of September. The highest count of red salmon for any one day was

84,877 on September 24. The total count of red salmon for the season was 876,335, and in addition, 26,919 cohos, 5,310 kings, and 5,786 pinks were tallied. Some fish were still in the lagoon when the weir was removed on October 5.

A good run of young red salmon migrating seaward began on May 29 and continued until June 17. Approximately 49,000 of these migrants were marked during the season. King salmon migrants came downstream in early August. The downstream run of Dolly Varden trout was unusually heavy.

On August 4 all the Karluk area except Uyak Bay was closed to commercial fishing, as the escapement of red salmon was less than the catch. The following day the section from Chief Point to West Point was reopened. Fishing in the remainder of the area was again permitted on August 19 until the close of the season on August 24. The total reported commercial catch of red salmon from the Karluk run was 661,573.

Weir operations at Karluk were in charge of H. H. Hungerford, under the supervision of Warden Charles P. Turner.

MORZHOVOI BAY

A weir was again maintained in the stream that empties into Middle Lagoon, Morzhovoi Bay, through which salmon were counted from June 10 to October 5, inclusive. The season's escapement numbered 18,367 red salmon, 4,089 cohos, and 113 pinks. Operations at this place were carried on by Gordon Ashton at the beginning of the season, by Charles R. Sullivan in August and the first half of September, and thereafter by Axel Williamson, under the supervision of Assistant Agent Fred R. Lucas.

ORZENOI RIVER

Construction of the weir in Orzenoi River was completed on June 13 and the first salmon passed upstream on June 22. From that date until September 6 there were counted 28,478 red salmon, 261 pinks, and 11 chums. The work was carried on by Woodrow F. Buckley until August 1 and then by Joe Evans, under the direction of Assistant Agent Fred R. Lucas.

RED RIVER

A fair run of salmon was entering Red River when the weir was installed on May 26 and, although not heavy at any time, it remained steady until about the middle of August. Unlike the usual condition, no high water interfered with weir operations. The total count of salmon from May 26 to August 20 consisted of 517,769 reds, 4,089 pinks, 2,841 kings, and 541 cohos. Two traps for capturing predatory trout were operated by the weir crew, making a total catch of 70,000. There was a heavy downstream migration of young red salmon in the early summer. Under the supervision of Warden Charles P. Turner, the construction of the weir was in charge of Henry B. Looff and Tom Frost was weir foreman during the season.

SALMON TAGGING

A salmon-tagging experiment was conducted in southeast Alaska in 1935 to develop further information concerning the migrations of pink salmon through Clarence Strait. Nineteen hundred pink salmon were tagged during closed periods from July 27 to August 17, inclusive, all the work being done at the McLean Arm trap of the Alaska Pacific Salmon Co. Leroy S. Christey, temporary assistant, performed the tagging operations, under the direction of Dr. Frederick A. Davidson. The patrol vessel *Kittiwake* and later the *Scoter* were detailed to assist with the undertaking. A reward of 25 cents each was paid for the return of tags from the marked fish accompanied by information as to the time and place of recapture. The returns amounted to more than 33 percent of the total number of tags placed on the fish.

It is planned to conduct a similar experiment in Clarence Strait in 1936 to determine any differences in the migrations of the pink salmon runs in the even and odd years.

SALMON LIFE-HISTORY STUDIES

Studies of the life histories and fluctuations in the abundance of the Pacific salmon in Alaska were continued in 1935 by the staff of the Fisheries Biological Station at Seattle, Wash. These studies are of necessity confined to definite localities, but it is felt that the information secured from them is in general applicable to the same species in all parts of the Territory. A major investigation dealing with the red salmon was conducted at Karluk, and one pertaining to the pink salmon was carried on at Little Port Walter. Biological data on the red salmon runs were also collected in the Bristol Bay, Chignik, and Copper River areas.

Salmon-counting weirs maintained at Karluk and Little Port Walter furnished data regarding the number of adults returning to the streams to spawn. The results from the studies at these two locations, together with information collected at various points throughout the Territory, indicate that the changes in natural conditions under which the young develop greatly influence the abundance of salmon. Efforts are being made to evaluate these natural factors in order to provide information relative to the probable abundance of each year's runs.

An investigation dealing with daily catch records of the principal types of fishing gear in the various fishing areas throughout Alaska was started during 1935, the primary aim of which is to secure information concerning the yearly fluctuations in the abundance and time of appearance of the salmon runs in each area. Information on these fluctuations, which are due to natural as well as artificial causes, is of importance in determining proper regulations for the conservation of the runs.

Studies dealing with the biological changes that take place within the pink salmon during the spawning migration and affect the quality of the commercial pack were continued during the year, in cooperation with the Seattle branch of the National Canners' Association. A preliminary report, entitled "Physical and chemical changes in the pink salmon during the spawning migration", has been prepared for publication as Investigational Report No. 33, by Frederick A. Davidson and O. Eugene Shostrom.

UNUSUAL MORTALITY OF SALMON

A most unusual occurrence of the season, and one heretofore unrecorded in the salmon fishery of the Territory, was an alarming mortality among salmon and other species caught in traps along the west coast of Tuxekan Island from July 22 to July 28. So great was the mortality during this period that the operators in this restricted locality kept their traps closed and brailed no fish from them. Observations were made of the behavior of salmon held in the traps on several days. The first symptom of distress was the rising of the fish to the surface, after which they began gasping and weaving from side to side and then suddenly died. Samples of water and of dead salmon were collected for examination but did not reveal the cause of mortality. In addition to salmon, such diverse species as flounders, dogfish, and pollock were similarly affected.

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

The progress of the runs of salmon in each district in Alaska is observed closely by field employees in order that appropriate regulatory measures may be issued promptly to meet unexpected occurrences. After the close of fishing operations, representative spawning streams in all parts of the Territory are examined to determine the adequacy of the escapement.

Southeast Alaska.—Pink salmon in all parts of southeastern Alaska were of unusually large size and, except in the southern district, the runs were late. In the southern district this species appeared early and the run continued good to within a few days of the end of the season. Although the run was numerically weaker than that of 1934, a larger pack was realized in this district as a result of the large size of the individual fish. Red and chum salmon were much more plentiful than in 1934, and the run of cohos was of about the same magnitude as in that year. There was a sufficient escapement of all species to seed the spawning gravels properly in nearly all parts of the district. Conditions on the spawning grounds were good during the early part of the season, but the lack of rain in September and early October caused the stream flow to drop to a low level. This situation was relieved by late fall rains.

The salmon runs in the southern part of the Clarence Strait district were much the same as in the southern district. Particularly good escapements were noted in Karta River, Skowl Arm, and in the west arm of Cholmondeley Sound. In the northern part of the district the escapement was derived from late runs and was only fair.

The pink salmon run on the west coast of Prince of Wales Island was late, irregular, and much smaller than in 1934. The escapement of this species was generally poor, and especially small spawning colonies were observed in the important streams in the northern part of the district; although below average, the escapement was somewhat better in the southern part. The runs of reds and cohos were better than in the preceding year, and large runs of chums were observed throughout the district. Good escapements of these species were reported.

In the Sumner Strait district the runs were above average. The pink salmon run reached its peak about August 1, after which it steadily declined. The escapement, except in Anan Creek and Olive

Cove, was disproportionately small, owing to very intensive commercial fishing in these waters.

Late pink salmon runs of smaller than average proportions were reported in the Icy Strait, western, and eastern districts. This species continued to appear after the close of fishing operations, and fair escapements were observed in the western and eastern districts. The escapement of pinks in the Icy Strait district was unsatisfactory. The runs of reds, chums, and cohos also were below normal, although the red salmon runs in the western and eastern districts were somewhat better than in 1934.

Good runs of reds in the Yakutat district were associated with satisfactory escapements of that species. The runs of king and pink salmon were exceptionally small for this district, and only a fair run of cohos was observed. Chums are not an important species in the Yakutat region.

Prince William Sound and Copper River region.—The pink salmon run began in Prince William Sound in a small way at the opening date for fishing and increased in volume as the season progressed, but dropped off abruptly after the close of fishing. Throughout the season fish were much more abundant on the west side of the sound than on the east side. The escapement was irregular, the streams tributary to the east side with few exceptions being poorly seeded, while those in the northern and western parts of the sound were generally better supplied with spawning fish.

Labor trouble prevented operations during most of the red and king salmon runs to Copper River, and most of these fish escaped to the spawning grounds. A small run of reds was anticipated, and this beneficial escapement undoubtedly will be reflected in related runs of the future. The fall run of cohos was good, and as fishing was voluntarily limited the escapement was satisfactory. In Bering River the run of reds was below normal and, although most of the run reached the spawning grounds, the seeding was not adequate.

Cook Inlet.—The run of red salmon was comparatively small, but because of protective regulations and interruption of fishing operations by unfavorable weather conditions the escapement of this species was fair. The king salmon run and escapement were good. As anticipated, the pink salmon run was almost a failure, and so inadequate was the spawning that only another poor run can be expected to develop from it. Chums were less abundant than usual but the escapement, especially in the lower part of the inlet, was fair. Practically the entire run of cohos, which was of normal proportions, was allowed to spawn, as there was but little commercial interest in this species.

Kodiak area.—The runs of pink salmon were heavy in all parts of the Kodiak area and the escapement was uniformly large. Good runs of red salmon occurred in Karluk and Red Rivers, while in Alitak and Uganik Bays the runs of this species were below average. The runs and escapements of other species were fair but somewhat smaller than in 1934.

Chignik.—Throughout the season the run of red salmon was light and the escapement was correspondingly small, being slightly more than 50 percent of the run. The run of pinks, for an off year, was fair, as was the escapement also. The chum run was better than for several years, but the escapement was smaller than in 1934. The coho run and escapement were light.

Alaska Peninsula.—The runs of red salmon along the south side of the Alaska Peninsula and at Port Moller, reflecting the condition of the Bristol Bay runs, were far below average. This species was slow in appearing and few were canned prior to June 20. The pink salmon run on the south side of the peninsula was smaller than in 1934, but most of the spawning streams were observed to be well seeded. There was a fair seeding of chums also.

Bristol Bay.—The red salmon runs in Bristol Bay were much above expectations, and because of limited operations and additional protective measures the spawning escapement was good. Especially large runs were reported in Kvichak and Egegik Rivers. There was no commercial fishing in Ugashik River, and the entire run, except for a few fish taken for local use, reached the spawning grounds. It is believed that the escapement in all the rivers of Bristol Bay, except perhaps the Nushagak, was of such size as to build up this weak run of the cycle which has been apparent for many years.

HATCHERIES

The privately owned hatchery on Hugh Smith Lake was again operated by the Pacific American Fisheries, Inc. From the 10,221,000 red salmon eggs that were collected at the hatchery in 1934, there were produced and liberated in Alaska waters 9,860,000 salmon fry. A collection of 34,383,000 red salmon eggs was made at this hatchery in 1935.

Under provisions of the act of June 26, 1906, the owners of private hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red salmon fry liberated by them in Alaska waters. In the fiscal year ended June 30, 1935, therefore, the rebate due the Pacific American Fisheries, Inc., on the 9,860,000 red salmon fry liberated at Hugh Smith Lake during the year amounted to $3,944.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1935 was 22,620, or 3,570 less than in 1934. Fishery products were valued at $31,230,646, a decrease of $10,732,647, or about 26 percent from the preceding year. Of the total amount, 87.5 percent represented the value of salmon products; 7.6 percent, herring; 2 percent, halibut; and 2.9 percent, the value of all other fishery products.

Summary of persons engaged and products of the Alaska fisheries in 1935

Items	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites	6,581		4,641		1,399		12,621	
Natives	3,596		1,442		1,163		6,201	
Chinese	143		245		17		405	
Japanese	609		263		60		932	
Filipinos	1,314		1,001		94		2,409	
Mexicans	17		10				27	
Miscellaneous	19		5		1		25	
Total	12,279		7,607		2,734		22,620	
PRODUCTS								
Salmon:								
Canned ... cases	3,054,038	$13,910,783	1,802,231	$9,431,018	276,853	$2,426,335	5,133,122	$25,768,136
Mild cured ... pounds	4,308,000	857,603	20,000	2,370	114,400	13,720	4,442,400	873,693
Pickled ... do	49,200	4,908	312,800	35,832	534,175	54,418	896,175	95,158
Fresh, for food ... do	2,943,017	167,784	8,619	643			2,951,636	168,427
Frozen, for food ... do	4,266,834	270,178					4,266,834	270,178
Fresh, for fox feed ... do			8,400	42			8,400	42
Frozen, for bait ... do	240,930	1,205					240,930	1,205
Dry-salted and dried ... do	38,100	4,471	21,800	1,962	1,436,000	114,960	1,495,900	121,393
Smoked and canned ... cases	45	225					45	225
Caviar ... pounds	17,000	2,100					17,000	2,100
Fertilizer ... do	900,000	13,500	271,900	3,263			1,171,900	16,763
Oil ... gallons	36,000	10,000	13,000	5,200			49,000	15,200
Herring:								
Fresh, for bait ... pounds	2,059,055	22,059	273,750	2,665			2,332,805	24,724
Frozen, for bait ... do	3,626,670	25,788					3,626,670	25,788
Frozen, for food ... do			40,000	1,200			40,000	1,200
Pickled, for food:								
Scotch cure ... do	2,187,000	116,612	9,343,325	543,055	3,412,425	148,397	14,942,750	808,064
Norwegian cure ... do			4,000	360			4,000	360
Roused, for food (bloater stock) ... do			108,150	3,245	1,211,320	31,548	1,319,470	34,793
Spiced ... do	1,000	160					1,000	160
Dry-salted ... do					314,775	7,551	314,775	7,551
Meal ... do	18,108,962	216,744	12,014,194	140,984			30,123,156	357,728
Oil ... gallons	2,239,730	669,385	1,552,679	444,339			3,792,409	1,113,724
Halibut:								
Fresh ... pounds	5,936,134	363,525					5,936,134	363,525
Frozen ... do	3,869,546	244,320					3,869,546	244,320

Summary of persons engaged and products of the Alaska fisheries in 1935—Continued

Items	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PRODUCTS—continued								
Cod:								
Dry-salted pounds			80, 210	$3, 417	26, 598	$1, 138	106, 808	$4, 555
Pickled do			32, 789	1, 130			32, 789	1, 130
Stockfish do			8, 140	1, 128			8, 140	1, 128
Whale:								
Oil gallons			309, 939	116, 300	523, 360	196, 260	833, 299	312, 560
Sperm oil do			77, 950	18, 708	114, 900	27, 576	192, 850	46, 284
Fertilizer pounds			1, 070, 000	12, 950	1, 608, 000	18, 590	2, 678, 000	31, 540
Clam:								
Canned cases	738	$3, 634	33, 371	193, 617			34, 109	197, 281
Juice do	150	300					150	300
Crab:								
Canned do	11, 307	93, 213	1, 334	13, 619			12, 641	106, 832
Meat pounds	93, 998	35, 904	43, 908	17, 703			137, 906	53, 607
Whole in shell dozen	1, 242	2, 582	194	307			1, 436	2, 889
Shrimp:								
Canned cases			24	192			24	192
Meat pounds	371, 029	126, 355	856	294			371, 885	126, 649
Whole in shell, fresh do	9, 777	1, 407					9, 777	1, 407
Raw frozen do	1, 629	652					1, 629	652
Trout:								
Fresh do	16, 470	1, 135					16, 470	1, 135
Frozen do	16, 412	1, 270					16, 412	1, 270
Sablefish:								
Fresh do	80, 516	4, 428					80, 516	4, 428
Frozen do	478, 769	18, 093					478, 769	18, 093
Pickled do	6, 161	318					6, 161	318
Rockfish: Frozen do	5, 344	189					5, 344	189
Flounder: Fresh do	250, 000	3, 750					250, 000	3, 750
Total		17, 194, 580		10, 995, 573		3, 040, 493		[1] 31, 230, 646

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[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch, exclusive of whales, to the fishermen was approximately $8,703,000. The round weight of the salmon catch landed by the fishermen was approximately 434,004,000 pounds, and the corresponding figure for herring was about 189,287,000 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 4,422,411 pounds of dry-salted cod and 16,926 pounds of tongues, having a total value of $200,189, landed at ports of the Pacific Coast States.

SALMON

The stringent curtailment of commercial fishing in the Bristol Bay region, for the purpose of building up weak runs of red salmon recurrent in the years divisible by 5, resulted in a small catch of all species in the western district in the 1935 season.

Red-salmon runs were light also at Port Moller and Herendeen Bay and in parts of central Alaska, notably the Ikatan-Shumagin region and Chignik. The output was also affected by prolonged price disagreements between packers and fishermen and cannery workers in the Copper River section, during which fishing operations were suspended. The total catch of red salmon in 1935 was less than one-third that of the preceding year, but it did not drop far below the catch for the comparable cyclical year 1930, notwithstanding the greater restrictions in the later year.

The number of pink salmon taken, although well above the average, was considerably less than the record catch of the preceding year. The individual fish, however, were of remarkably large size in many districts, so that the decrease from 1934 in the amount of products was not proportionate to the decrease in catch.

Commercial catches of the three less abundant species of salmon in Alaska in 1935 compared favorably with the average for recent years. Both chums and kings showed increases over 1934, while there was a decrease in the catch of cohos.

The total catch of salmon decreased 37 percent from that for 1934. By districts, the decrease was 31 percent in southeast Alaska, 17 percent in central, and 81 percent in western Alaska.

There was an increase of about 47 percent for the whole of Alaska in the number of fathoms of seines used, while the number of fathoms of gill nets decreased 40 percent and the number of traps about 3 percent, as compared with those in operation in 1934.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1935 was 974, of which 780 were purse seines and 194 beach seines. The purse seines aggregated 114,300 fathoms of webbing, and the beach seines 18,452 fathoms. The number of gill nets used was 2,396, having a total length of 140,363 fathoms. There were 164 driven and 283 floating traps—a total of 447.

Southeastern Alaska was accredited with 569 seines, or a total of 89,440 fathoms, an increase of 223 seines and 31,750 fathoms of webbing over the number used in 1934; also with 359 gill nets, aggregating 28,425 fathoms, an increase of 55 nets and 7,410 fathoms of webbing; and with 30 driven and 250 floating traps, an increase of 2 driven traps, but a decrease of 12 floating traps, as compared with the number operated in 1934.

Corresponding figures for central Alaska show 397 seines, or 41,412 fathoms, as compared with 281 seines, or 30,753 fathoms, in 1934; 993 gill nets, or 67,676 fathoms, as compared with 984 gill nets, or 52,815 fathoms, in 1934; and 134 driven and 33 floating traps, as compared with 134 driven and 35 floating traps in 1934.

In western Alaska, 8 seines, or 1,900 fathoms of webbing, were used, an increase of 2 seines and 220 fathoms of webbing, as compared with the figures for 1934. There were 1,044 gill nets used, or an aggregate of 44,262 fathoms, a decrease of 1,332 nets and 116,364 fathoms of webbing. No traps were operated in this district.

Seines caught 37 percent of the salmon taken in 1935, gill nets 9 percent, and traps 52 percent, while lines and wheels took the remaining 2 percent.

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1934	1935	1934	1935	1934	1935
Seines	29	32	33	47	5	10
Gill nets	1	3	7	7	94	81
Traps	68	62	60	46		
Lines	2	3				
Wheels					1	9

The total catch of salmon in 1935 was 73,263,804, a decrease of 43,385,268, or 37 percent, from the number taken in 1934. There was a decrease of 18,045,235 in southeast, 5 ,954,421 in central, and 19,385,612 in western Alaska. By species, the catch of chums increased 1,306,886 and kings 240,838, while the catch of cohos decreased 408,027, pinks 22,819,074, and reds 21,705,891.

Salmon taken in 1935, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver	229, 041	55, 436	1	284, 478
Chum, or keta	2, 919, 154	1, 384, 510	32, 342	4, 336, 006
Pink, or humpback	9, 081, 153	11, 291, 553	78	20, 372, 784
King, or spring	22, 164	2, 212	977	25, 353
Red, or sockeye	429, 802	906, 757	416, 842	1, 753, 401
Total	12, 681, 314	13, 640, 468	450, 240	26, 772, 022
Gill nets:				
Coho, or silver	244, 335	180, 361	9, 014	433, 710
Chum, or keta	84, 311	204, 518	535, 065	823, 894
Pink, or humpback	350, 703	378, 175	34	728, 912
King, or spring	18, 093	59, 622	40, 011	117, 726
Red, or sockeye	408, 081	1, 113, 442	3, 218, 014	4, 739, 537
Total	1, 105, 523	1, 936, 118	3, 802, 138	6, 843, 779
Traps:				
Coho, or silver	707, 554	302, 790		1, 010, 344
Chum, or keta	2, 079, 554	1, 798, 977		3, 878, 531
Pink, or humpback	20, 815, 292	8, 301, 793		29, 117, 085
King, or spring	5, 697	35, 444		41, 141
Red, or sockeye	1, 054, 851	2, 954, 321		4, 009, 172
Total	24, 662, 948	13, 393, 325		38, 056, 273
Lines:				
Coho, or silver	578, 724	1, 440		580, 164
Chum, or keta	522			522
Pink, or humpback	458			458
King, or spring	595, 503			595, 503
Red, or sockeye	102			102
Total	1, 175, 309	1, 440		1, 176, 749
Wheels:				
Chum, or keta			394, 209	394, 209
King, or spring			20, 772	20, 772
Total			414, 981	414, 981
Total:				
Coho, or silver	1, 759, 654	540, 027	9, 015	2, 308, 696
Chum, or keta	5, 083, 541	3, 388, 005	961, 616	9, 433, 162
Pink, or humpback	30, 247, 606	19, 971, 521	112	50, 219, 239
King, or spring	641, 457	97, 278	61, 760	800, 495
Red, or sockeye	1, 892, 836	4, 974, 520	3, 634, 856	10, 502, 212
Grand total	39, 625, 094	28, 971, 351	4, 667, 359	73, 263, 804

CANNING

CHANGES IN CANNERIES

In April 1935 the Pacific American Fisheries, Inc., purchased the properties of the Booth Salmon Co. in Alaska, formerly operated by the Northwestern Fisheries Co., which it had leased in 1933. Joint operations of the Astoria & Puget Sound Canning Co. and the Pacific American Fisheries, Inc., on Excursion Inlet were carried on at the former's plant under the name of Consolidated Fisheries. The salmon cannery that had been operated for 2 years by the Kelly Packing Co. at Ketchikan was taken over and operated by a new company, the Balcom-Payne Fisheries, Inc. The Lake Bay cannery of the Columbia River Packers Association, which has been idle since 1930, was purchased by Karl Thiele, of the Diamond K Packing Co.

A new organization, the W. R. Gilbert Co., Inc., purchased the old cannery of the Alaska Sea Food Co. at Point Whitshed that had been last operated in 1923, and rehabilitated and operated it during the season, packing both salmon and clams. The salmon and clam cannery of the Hemrich Packing Co. at Kukak Bay, which was last operated in 1932 by the Pioneer Packing Co., was acquired and operated by the new Surf Canneries, Inc. The Washington Fish & Oyster Co., Inc., purchased the cannery of the Port Williams Packing Co. at Port Williams, which it had operated on lease in 1934. The Cook Inlet Packing Co. reopened its plant at Seldovia, which had been idle for a year, and the Pacific American Fisheries, Inc., operated its Port Moller plant, which had been used in 1934 by the Herendeen Bay Consolidated Canneries.

NEW CANNERIES

In southeast Alaska, A. R. Brueger started canning salmon, as well as continuing in the mild-curing industry and in the handling of fresh and frozen salmon and halibut. The Hydaburg Fisheries, Inc., at Hydaburg, was another new operator in this district; its equipment was installed in a building that had been erected in 1927 for use as a warehouse by the Far North Fisheries, Inc., in connection with its cannery operations on the floating plant *Pioneer*. Besides reconditioning the building and installing machinery, the company constructed a new fish house, cabins for workmen, and other accessory buildings. A new cannery building was erected by Libby, McNeill & Libby for their plant at Craig, and the equipment was transferred to it before the opening of the season, the old building then serving as a warehouse.

A salmon and clam cannery was established by Scotty's Packing Co. at Hartney Point in the building formerly used by S. E. Smith in clam-canning operations. The Alaska Icepak Corporation at Cordova, which was engaged in canning crabs only in 1934, extended its operations to include salmon and clam canning in the 1935 season. The Glacier Sea Foods Co. erected a modern shore cannery at Cordova to replace the floating plant which it had operated there, but the work was not completed in time for operation during the season. The Halibut Bay Packing Co. was formed early in 1935 to take over the plant of the Hand Packing Co. of Bert Heglund, which had been canning clams at Halibut Bay for 3 successive years. This plant prepared a small amount of hand-packed salmon in 1932, but it was not included in the list of salmon canneries. Its chief output in 1935 was canned salmon, although a small pack of clams was also produced. A hand cannery known as the Alaska Native Cooperative Consolidated Cannery was operated by a group of natives at Sand Point Village.

CANNERIES NOT OPERATED

The plant of the Pacific American Fisheries, Inc., at Excursion Inlet was closed during the season, as its catch of salmon was packed at the cannery of the Astoria & Puget Sound Canning Co. under a cooperative arrangement.

The Cordova Fisheries Co., Inc., which entered the salmon-canning business at Cordova in 1934, canned only clams in 1935. The Glacier Sea Foods Co. did not operate its plant at Cordova, the new building to replace the floating cannery being incomplete when the season opened, and its catch was packed by the New England Fish Co. Other canneries in the central district that had operated in the previous year and were closed in 1935 were the Shepard Point Packing Co. at Shepard Point, the Seward Fisheries, Inc., at Seward, and the Ninilchik Packing Co. at Ninilchik.

Fourteen canneries that had operated in the Bristol Bay district in 1934 remained idle in 1935 because of the sharp curtailment of fishing for conservation purposes. Of these, 4 were plants of the Alaska Packers Association, 3 of Libby, McNeill & Libby, 2 of Pacific American Fisheries, Inc., 2 of Red Salmon Canning Co., and 1 each of the Alaska Salmon Co., Bristol Bay Packing Co., and the Nakat Packing Corporation.

The salmon and clam cannery of the Enterprise Seafood Co. at Ninilchik, which was idle in 1934, was reopened for packing clams only. The Blue Island Packing Co. has been dropped from the list of idle canneries, as its operations in recent years have been devoted entirely to herring. Other canneries which are no longer listed, because they have been dismantled, are as follows: Alaska Packers Association, Nushagak Bay; and Pacific American Fisheries, at Dundas Bay, Shakan, and Nushagak.

The following canneries were closed during the year but may be reopened:

Southeast Alaska:	
Alaska Pacific Fisheries	Burnett Inlet.
Alaska Pacific Salmon Co	Boca de Quadra. Chomly. Funter Bay. Pybus Bay. Tenakee.
Alaska Packers Association	Loring. Wrangell.
Alaska Sanitary Packing Co	Cape Fanshaw.
Hoonah Packing Co	Gambier Bay.
Icy Straits Fisheries, Inc. (floating plant)	Idaho Inlet.
Libby, McNeill & Libby	Klawak.
Nakat Packing Corporation, The	Ketchikan.
Pacific American Fisheries, Inc	Boca de Quadra. Excursion Inlet. Hunter Bay. Kasaan. Ketchikan. Port Walter. Santa Ana.
Karl Thiele	Lake Bay.

Central Alaska:	
Alaska General Fisheries	Anchorage.
Alaska Packers Association	Alitak. Chignik. Kasilof.
Anderson Mercantile Co., Inc	Deep Creek.
W. G. Culver	Point McManus.
Glacier Sea Foods Co	Cordova.
Gustan & Vogel	Point Possession.
Ninilchik Packing Co	Ninilchik.
North Coast Packing Co	Do.
Northern Light Packing Co	Mountain Slough.
Pacific American Fisheries, Inc	Bering River. Chignik. Kenai. Orca. Unakwik Inlet. Uyak. Valdez. Zachar Bay.
Point Possession Fish Co	Point Possession.
Redoubt Bay Packing Co	Redoubt Bay.
E. Sandvik	Swansons Creek.
Seward Fisheries, Inc	Seward.
Shepard Point Packing Co	Shepard Point.
Harvey J. Smith	West Foreland.
Spur Fish Corporation	Nikishka Bay.
Sunset Packing Co	Otter Creek.
John Wik	Kenai.
Jake Young	Port Chatham.
Western Alaska:	
Alaska Packers Association	Egegik River. Kvichak Bay. Naknek River (2). Ugashik River.
Alaska Salmon Co	Wood River.
Bristol Bay Packing Co	Kvichak Bay.
Columbia River Packers Association	Nushagak Bay.
Herendeen Bay Consolidated Canneries	Herendeen Bay.
Libby, McNeill & Libby	Libbyville. Lockanok. Nushagak.
Nakat Packing Corporation, The	Nakeen.
Pacific American Fisheries, Inc	Naknek River (2). Nushagak Bay.
Red Salmon Canning Co	Naknek River (2). Ugashik River.

TOTAL CANNERIES OPERATED

Ninety-nine canneries were operated in Alaska in 1935—45 in southeast, 45 in central, and 9 in western Alaska—which is an increase of 1 each for the southeast and central districts and a decrease of 13 for the western district, a net decrease of 11 plants. The floating canneries *International*, of the International Packing Co., *Memnon*, of the Columbia River Packers Association, *Santa Flavia*, of the Lowe Trading Co., and *La Merced*, of the Alaska Southern Packing Co., Inc., were operated in both central and western Alaska, and the *La Merced* also put up a pack in southeast Alaska in the fall season. Each of these plants is included but once in the total, the *International* and *La Merced* being credited to central Alaska, and the *Memnon* and *Santa Flavia* to the western district.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1935

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
Alaska Pacific Salmon Co	4	Kake	1	10	11
		Ketchikan	3	7	10
		Port Althorp	------	18	18
		Rose Inlet	------	9	9
Alaska Southern Packing Co., Inc	1	Todd and Cholmondeley Sound (floating).	------	------	------
Annette Island Canning Co	1	Metlakatla	1	7	8
Balcom-Payne Fisheries, Inc	1	Ketchikan	------	------	------
Beegle Packing Co	1	do	2	2	4
Berg Packing Co	1	Tongass Narrows (floating)	------	------	------
A. R. Brueger	1	Wrangell *	------	------	------
Consolidated Fisheries	1	Excursion Inlet	1	12	13
Deep Sea Salmon Co	1	Skowl Arm	------	7	7
Diamond K Packing Co	1	Wrangell	2	3	5
Douglas Fisheries Co	1	Douglas	------	------	------
Fidalgo Island Packing Co	2	Bay of Pillars	5	------	5
		Ketchikan	3	2	5
Haines Packing Co	1	Letnikof Cove	------	------	------
P. E. Harris & Co	1	Hawk Inlet	------	7	7
Hood Bay Canning Co	1	Hood Bay	------	4	4
Hydaburg Fisheries, Inc	1	Hydaburg *	------	------	------
Icy Straits Salmon Co	1	Hoonah	------	------	------
Independent Salmon Canneries, Inc	1	Ketchikan	------	1	1
Ketchikan Packing Co	1	do	------	2	2
Klawock Packing Co	1	Klawak	------	------	------
Lane Bros	1	Moira Sound	------	------	------
Libby, McNeill & Libby	4	Craig	1	8	9
		George Inlet	------	6	6
		Taku Harbor	5	9	14
		Yakutat	------	------	------
Lindenberger Packing Co	1	Craig	------	------	------
Nakat Packing Corporation, The	3	Hidden Inlet	------	6	6
		Union Bay	------	6	6
		Waterfall	------	8	8
New England Fish Co	3	Chatham	------	6	6
		Ketchikan	------	5	5
		Noyes Island	------	6	6
Ocean Packing Co	1	Klawak	------	------	------
Pacific American Fisheries, Inc	1	Ketchikan [1]	3	13	16
		Petersburg	2	5	7
Peril Straits Packing Co	1	Todd	------	6	6
Pyramid Packing Co., Inc	1	Sitka	------	4	4
Red Salmon Packers Association	1	Yakutat (floating)	------	------	------
Scow Bay Packing Co	1	Scow Bay	1	1	2
Sebastian Stuart Fish Co	1	Tyee	------	6	6
Superior Packing Co	1	Tenakee	------	5	5
Ward's Cove Packing Co	1	Ward Cove	------	4	4
Wrangell Packing Co	1	Wrangell	------	3	3
Central Alaska:					
Alaska General Fisheries	------	Anchorage [1]	2	------	2
Alaska Icepak Corporation	1	Cordova *	------	------	------
Alaska Native Cooperative Consolidated Cannery.	1	Sand Point Village *	------	------	------
Alaska Pacific Salmon Co	2	Drier Bay	------	4	4
		Sand Point	3	------	3
Alaska Packers Association	2	Chignik	2	------	2
		Karluk	3	------	3
Alaska Southern Packing Co	1	Traders Cove and Kupreanof Harbor (floating).	------	------	------
Alaska Year-Round Canneries Co	1	Seldovia	4	------	4
Columbia River Packers Association	1	Chignik [1]	3	------	3
		Ikatan Bay and Kupreanof Harbor (floating).	------	------	------
Cook Inlet Packing Co	1	Seldovia	7	------	7
Copper River Packing Co	1	McClure Bay	------	5	5
Harry W. Crosby	1	Chignik	------	------	------
Herbert T. Domenici	1	Uyak	------	------	------
Emard Packing Co	1	Anchorage	4	------	4
Fidalgo Island Packing Co	1	Port Graham	8	------	8
W. R. Gilbert Co., Inc	1	Point Whitshed	------	------	------
Glacier Sea Foods Co	------	Cordova [1]	1	------	1
Grimes Packing Co	1	Uzinki	------	------	------

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[1] Traps only were operated, the fish being packed at other canneries.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1935—Continued

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Halibut Bay Packing Co	1	Halibut Bay *	------	------	------
P. E. Harris & Co	1	False Pass	8	------	8
International Packing Co	1	Ikatan Bay and Ivanof Bay (floating).	------	------	------
Kadiak Fisheries Co	2	Kodiak	5	------	5
		Shearwater Bay	------	------	------
Kustatan Packing Co	1	Anchorage	------	------	------
Libby, McNeill & Libby	1	Kenai	13	------	13
Lowe Trading Co	1	Fox Bay (floating)	------	------	------
New England Fish Co	1	Cordova	4	------	4
A. N. Nilson	1	Portlock	------	------	------
Ninilchik Packing Co	------	Ninilchik [1]	2	------	2
North Pacific Sea Foods	1	Fort Liscum	------	------	------
Pacific American Fisheries, Inc	3	Alitak	6	------	6
		Chignik [1]	2	------	2
		King Cove	14	------	14
		Squaw Harbor	3	------	3
Pioneer Canneries, Inc	1	Cordova	2	1	3
Pioneer Sea Foods Co	1	Eyak River	------	3	3
Premier Salmon Co	1	Stevens Creek	2	1	3
Puget and Alaska Canning Co	1	Seldovia	------	------	------
San Juan Fishing & Packing Co	2	Port San Juan	2	2	4
		Uganik Bay	4	------	4
Albert and Josie Sandvik	1	Uganik Village	------	------	------
Scotty's Packing Co	1	Hartney Bay*	------	------	------
Shelikof Packing Co., Inc	1	Zachar Bay	------	------	------
Shepard Point Packing Co	1	Port Ashton	------	9	9
Snug Harbor Packing Co	1	Snug Harbor	4	------	4
Strand-Jensen Fisheries Co	1	Cordova	------	------	------
Surf Canneries	1	Kukak Bay	------	------	------
Uganik Fisheries, Inc	1	Uganik	3	------	3
Washington Fish and Oyster Co., Inc	1	Port Williams	------	------	------
Western Pacific Packing Co	1	Mist Harbor (floating)	------	------	------
Western Alaska:					
Alaska Packers Association	3	Kvichak Bay	------	------	------
		Naknek River	------	------	------
		Nushagak Bay	------	------	------
Alaska Southern Packing Co	1	Port Moller (floating)	------	------	------
Columbia River Packers Association	1	Nushagak and Port Moller (floating).	------	------	------
International Packing Co	1	Port Moller (floating)	------	------	------
Libby, McNeill & Libby	3	Egegik River	------	------	------
		Ekuk	------	------	------
		Koggiung	------	------	------
Lowe Trading Co	1	Nushagak River (floating)	------	------	------
Pacific American Fisheries, Inc	1	Port Moller	------	------	------

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[1] Traps only were operated, the fish being packed at other canneries.

LOSSES AND DISASTERS

Reported property losses in the Alaska fisheries in 1935 amounted to $178,784, a large part of which represented the destruction of the Pioneer Sea Foods Co. cannery at the mouth of Eyak River by fire on November 29. In addition to the loss of the building and equipment, amounting to $115,000, boats valued at $35,000 that had been stored in the cannery were destroyed. A purse seine boat of the Grimes Packing Co., valued at $4,500, was burned at the dock at Uzinki as the result of an explosion in the galley range. Other losses consisted chiefly of miscellaneous small boats and fishing apparatus and amounted to $8,798 in southeast, $13,049 in central, and $2,437 in western Alaska.

Fourteen lives were lost, as follows: Four fishermen and two shoresmen were drowned, one fisherman and four shoresmen died of disease, and one fisherman and two shoresmen were killed in accidents.

STATISTICS

Ninety-nine canneries were operated in Alaska in 1935, or 11 less than in the previous year. Employment was given to 17,529 persons, as compared with 21,654 in 1934, a decrease of 4,125. White employees decreased 1,994, Chinese 471, Japanese 362, Filipinos 605, Mexicans 703, Negroes 24, and miscellaneous (Kanakas, Koreans, Puerto Ricans, etc.) 36; while natives increased 70.

The total pack of canned salmon was 5,133,122 cases, valued at $25,768,136. This is a decrease of 31 percent both in quantity and value from the production in 1934, when the pack amounted to 7,481,830 cases, valued at $37,611,950. The output in southeast Alaska decreased from 3,295,093 cases to 3,054,038 cases, or 7 percent; in central Alaska from 2,327,418 cases to 1,802,231 cases, or about 23 percent; and in western Alaska from 1,859,319 cases to 276,853 cases, or 85 percent. By species, in Alaska as a whole, the pack of cohos decreased from 236,117 cases in 1934 to 190,177 cases in 1935, or 19 percent; pinks, from 3,824,193 cases to 3,244,066 cases, or 15 percent; kings, from 52,863 cases to 36,405 cases, or 31 percent; and reds, from 2,628,016 cases to 809,546 cases, or 69 percent; while the pack of chums increased from 740,641 cases to 852,928 cases, or 15 percent.

Details are included in the following tables to show comparison of the 1935 pack with the average for the 5 preceding years, 1930 to 1934, by cases of each species and by districts. Pink salmon and chums show gains over the 5-year average, but these gains are offset by declines in cohos, kings, and reds, especially the last. It is noteworthy, however, that the pack of red salmon was not very far below that of the corresponding cyclical year of 1930, notwithstanding the greater curtailment of commercial fishing in the Bristol Bay region. By districts, the pack in 1935 increased about 17 percent over the 5-year average in southeast Alaska and 3 percent in the central district, while in western Alaska there was a decrease of about 79 percent, making a net decrease of nearly 10 percent from the 5-year average for all of Alaska.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1935

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	1,382	1,501	432	3,315
Natives	1,561	648	176	2,385
Japanese	1		3	4
Filipinos	55	2	2	59
Mexicans	3			3
Miscellaneous [1]	1	4		5
Total	3,003	2,155	613	5,771
Shoresmen:				
Whites	2,027	1,462	602	4,091
Natives	1,750	595	228	2,573
Chinese	141	241	17	399
Japanese	586	262	57	905
Filipinos	1,223	994	92	2,309
Mexicans	11	10		21
Negro			1	1
Miscellaneous [1]	18	1		19
Total	5,756	3,565	997	10,318
Transporters:				
Whites	713	553	85	1,351
Natives	8	70	2	80
Chinese		4		4
Japanese	2	1		3
Filipinos	2			2
Total	725	628	87	1,440
Total:				
Whites	4,122	3,516	1,119	8,757
Natives	3,319	1,313	406	5,038
Chinese	141	245	17	403
Japanese	589	263	60	912
Filipinos	1,280	996	94	2,370
Mexicans	14	10		24
Negro			1	1
Miscellaneous [1]	19	5		24
Grand total	9,484	6,348	1,697	17,529
Wages paid shoresmen	$1,394,365	$1,021,258	$304,746	$2,720,369
Wages paid transporters	376,756	299,573	42,336	718,665
OPERATING UNITS				
Plants:				
Shore canneries	43	42	7	92
Floating canneries—				
Power vessels	1	2	2	5
Net tonnage	245	3,698	3,575	7,518
Barges	1	1		2
Net tonnage	1,092	494		1,586
Total plants operated	45	45	9	99
Vessels:				
Power, over 5 tons	544	188	29	761
Net tonnage	9,740	5,740	4,217	19,697
Launches	257	197	11	465
Power dories	25	41	7	73
Gill-net boats	136	162	215	513
Seine skiffs	313	191	5	509
Other rowboats and skiffs	712	541	100	1,353
Lighters and scows	196	187	33	416
Houseboats	16	3	5	24
Pile drivers	24	27	3	54
Pile pullers	3	5		8
Rigging scows	35	11		46
Apparatus:				
Purse seines	563	209	8	780
Fathoms	88,840	23,560	1,900	114,300
Beach seines	6	165		171
Fathoms	600	16,267		16,867
Gill nets	340	961	515	1,816
Fathoms	27,775	66,066	32,958	126,799
Traps, driven	30	134		164
Traps, floating	250	33		283

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[1] Kanakas, Koreans, Puerto Ricans, etc.

Output and value of canned salmon in Alaska in 1935 [1]

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho, or silver:								
½-pound flat	4, 808	$46, 208	2, 014	$17, 306			6, 822	$63, 514
1-pound flat	2, 094	15, 055	739	5, 173			2, 833	20, 228
1-pound tall	135, 591	855, 526	44, 708	276, 555	223	$1, 411	180, 522	1, 133, 492
Total	142, 493	916, 789	47, 461	299, 034	223	1, 411	190, 177	1, 217, 234
Chum, or keta:								
½-pound flat	1, 006	6, 036	641	3, 666			1, 647	9, 702
1-pound tall	539, 942	2, 053, 905	301, 482	1, 166, 752	9, 857	38, 712	851, 281	3, 259, 369
Total	540, 948	2, 059, 941	302, 123	1, 170, 418	9, 857	38, 712	852, 928	3, 269, 071
Pink, or humpback:								
½-pound flat	34, 576	222, 654	9, 984	62, 789			44, 560	285, 443
1-pound flat	687	2, 748					687	2, 748
1-pound tall	2, 164, 797	9, 037, 864	1, 034, 018	4, 094, 392	4	15	3, 198, 819	13, 132, 271
Total	2, 200, 060	9, 263, 266	1, 044, 002	4, 157, 181	4	15	3, 244, 066	13, 420, 462
King, or spring:								
½-pound flat	4, 969	64, 075	8, 493	72, 240			13, 462	136, 315
1-pound flat	2, 081	21, 289	4, 379	41, 435	60	564	6, 520	63, 288
1-pound tall	4, 058	28, 138	11, 590	83, 071	775	5, 907	16, 423	117, 116
Total	11, 108	113, 502	24, 462	196, 746	835	6, 471	36, 405	316, 719
Red, or sockeye:								
½-pound flat	29, 560	381, 892	57, 306	723, 278	632	7, 813	87, 498	1, 112, 983
1-pound flat	12, 505	121, 515	45, 188	451, 610			57, 693	573, 125
1-pound tall	117, 364	1, 053, 878	281, 689	2, 432, 751	265, 302	2, 371, 913	664, 355	5, 858, 542
Total	159, 429	1, 557, 285	384, 183	3, 607, 639	265, 934	2, 379, 726	809, 546	7, 544, 650
Grand total	3, 054, 038	13, 910, 783	1, 802, 231	9, 431, 018	276, 853	2, 426, 335	5, 133, 122	25, 768, 136

[1] Cases containing ½-pound cans have been reduced one-half in number, and thus, for the purpose of affording fair comparison, all are put upon the basis of 48 1-pound cans to the case.

Output of canned salmon in Alaska, in cases, 1930 to 1935 [1]

BY SPECIES

Product	1930	1931	1932	1933	1934	Average for 5-year period, 1930–34	1935	Percentage increase or decrease in 1935, as compared with 5-year average
Coho, or silver:								
¼-pound flat	371	-------	-------	-------	-------	74	-------	−100. 00
½-pound flat	18, 808	9, 962	3, 442	3, 367	5, 785	8, 273	6, 822	−17. 54
1-pound flat	5, 926	2, 902	1, 763	4, 657	8, 283	4, 706	2, 833	−39. 80
1-pound tall	307, 317	157, 014	142, 970	154, 544	222, 049	196, 779	180, 522	−8. 26
Total	332, 422	169, 878	148, 175	162, 568	236, 117	209, 832	190, 177	−9. 37
Chum, or keta:								
½-pound flat	8, 384	4, 242	624	658	2, 298	3, 241	1, 647	−49. 18
1-pound flat	-------	35	-------	-------	-------	7	-------	−100. 00
1-pound tall	591, 550	529, 579	819, 932	658, 131	738, 343	667, 507	851, 281	+27. 53
Total	599, 934	533, 856	820, 556	658. 789	740, 641	670, 755	852, 928	+27. 16
Pink, or humpback:								
¼-pound flat	1, 113	-------	-------	-------	-------	222	-------	−100. 00
½-pound flat	81, 064	46, 524	7, 166	14, 857	28, 793	35, 681	44, 560	+24. 88
1-pound flat	4, 867	4, 410	-------	-------	1, 668	2, 189	687	−68. 62
1-pound tall	3, 101, 490	2, 902, 926	2, 105, 979	2, 167, 694	3, 793, 732	2, 814, 364	3, 198, 819	+13. 66
Total	3, 188, 534	2, 953, 860	2, 113, 145	2, 182, 551	3, 824, 193	2, 852, 456	3, 244, 066	+13. 73
King, or spring:								
½-pound flat	17, 840	13, 208	11, 713	9, 955	9, 983	12, 540	13, 462	+7. 35
1-pound flat	23, 686	16, 721	14, 800	10, 021	10, 214	15, 088	6, 520	−56. 79
1-pound tall	18, 396	21, 938	43, 013	21, 437	32, 666	27, 490	16, 423	−40. 26
Total	59, 922	51, 867	69, 526	41, 413	52, 863	55, 118	36, 405	−33. 95
Red, or sockeye:								
¼-pound flat	370	-------	-------	-------	-------	74	-------	−100. 00
½-pound flat	110, 605	58, 178	47, 707	53, 638	88, 051	71, 636	87, 498	+22. 14
1-pound flat	62, 972	41, 002	75, 524	60, 052	73, 430	62, 596	57, 693	−7. 83
1-pound tall	677, 567	1, 595, 098	1, 979, 850	2, 066, 593	2, 466, 535	1, 757, 129	664, 355	−62. 19
Total	851, 514	1, 694, 278	2, 103, 081	2, 180, 283	2, 628, 016	1, 891, 435	809, 546	−57. 20
Grand total	5, 032, 326	5, 403, 739	5, 254, 483	5, 225, 604	7, 481, 830	5, 679, 596	5, 133, 122	−9. 62

BY DISTRICTS AND SPECIES

Product	1930	1931	1932	1933	1934	Average for 5-year period, 1930–34	1935	Percentage increase or decrease in 1935, as compared with 5-year average
Southeast Alaska:								
Coho, or silver	155, 652	88, 455	87, 038	95, 805	158, 527	117, 095	142, 493	+21. 69
Chum, or keta	283, 478	274, 248	579, 443	424, 861	394, 212	391, 248	540, 948	+38. 26
Pink, or humpback	2, 309, 976	2, 013, 442	1, 379, 006	1, 478, 013	2, 622, 362	1, 960, 560	2, 200, 060	+12. 22
King, or spring	6, 939	14, 896	23, 624	8, 146	15, 594	13, 840	11, 108	−19. 74
Red, or sockeye	221, 241	147, 895	138, 942	81, 126	104, 398	138, 720	159, 429	+14. 93
Total	2, 977, 286	2, 538, 936	2, 208, 053	2, 087, 951	3, 295, 093	2, 621, 463	3, 054, 038	+16. 50
Central Alaska:								
Coho, or silver	173, 352	81, 331	60, 674	65, 307	76, 371	91, 407	47, 461	−48. 08
Chum, or keta	284, 751	193, 053	147, 410	207, 879	313, 233	229, 265	302, 123	+31. 78
Pink, or humpback	859, 761	940, 418	724, 051	704, 538	1, 199, 872	885, 728	1, 044, 002	+17. 87
King, or spring	32, 060	27, 599	32, 302	23, 786	28, 472	28, 844	24, 462	−15. 19
Red, or sockeye	268, 621	439, 153	660, 161	484, 484	709, 470	512, 378	384, 183	−25. 02
Total	1, 618, 545	1, 681, 554	1, 624, 598	1, 485, 994	2, 327, 418	1, 747, 622	1, 802, 231	+3. 12
Western Alaska:								
Coho, or silver	3, 418	92	463	1, 456	1, 219	1, 330	223	−83. 23
Chum, or keta	31, 705	66, 555	93, 703	26, 049	33, 196	50, 242	9, 857	−80. 38
Pink, or humpback	18, 797	-------	10, 088	-------	1, 959	6, 169	4	−99. 94
King, or spring	20, 923	9, 372	13, 600	9, 481	8, 797	12, 434	835	−93. 28
Red, or sockeye	361, 652	1, 107, 230	1, 303, 978	1, 614, 673	1, 814, 148	1, 240, 336	265, 934	−78. 56
Total	436, 495	1, 183, 249	1, 421, 832	1, 651, 659	1, 859, 319	1, 310, 511	276, 853	−78. 87
Grand total	5, 032, 326	5, 403, 739	5, 254, 483	5, 225, 604	7, 481, 830	5, 679, 596	5, 133, 122	−9. 62

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[1] The number of cases shown has been put upon the common basis of forty-eight 1-pound cans per case.

Relative importance of each species of canned salmon within each district in 1935

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	4.7	17.7	72.0	0.4	5.2	100.0
Central Alaska	2.6	16.8	57.9	1.4	21.3	100.0
Western Alaska	.1	3.6	.0	.3	96.0	100.0
All Alaska	3.7	16.6	63.2	.7	15.8	100.0

Relative importance of each district in the production of each species of salmon canned in 1935

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	74.9	63.4	67.8	30.5	19.7	59.5
Central Alaska	25.0	35.4	32.2	67.2	47.5	35.1
Western Alaska	.1	1.2	.0	2.3	32.8	5.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Average annual price per case of 48 1-pound cans of salmon, 1925–35

Product	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Coho or silver	$9.72	$8.40	$8.51	$7.12	$7.59	$8.26	$6.51	$4.12	$5.20	$5.23	$6.40
Chum or keta	4.44	5.01	5.47	6.06	5.35	3.60	3.19	2.79	4.12	3.65	3.83
Pink or humpback	5.28	5.39	5.87	6.56	6.07	4.17	3.46	3.14	4.52	4.10	4.14
King or spring	11.91	10.37	11.25	11.13	11.92	13.32	9.40	5.46	7.51	6.85	8.70
Red or sockeye	13.12	9.89	12.08	9.41	10.71	12.57	9.20	5.61	6.71	6.72	9.32

PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1934. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

WESTERN ALASKA

Bristol Bay.—The Bering Sea shore, east and north of the Ugashik River.

Port Moller and Herendeen Bay.—Port Moller, Herendeen Bay, and Nelson Lagoon.

CENTRAL ALASKA

Ikatan-Shumagin Islands.—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.

Chignik.—Canneries located at Chignik.

Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.

Cook Inlet.—The shores of Cook Inlet.

Prince William Sound.—Resurrection Bay to Point Whitshed.

Copper and Bering Rivers.—Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

Yakutat and Dry Bay.—Yakutat Bay to and including Dry Bay.

Icy Strait-Lynn Canal.—West coast of Baranof and Chichagof islands, the shores of Cross Sound, Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.

Chatham Strait-Frederick Sound.—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.

Sumner Strait-Dixon Entrance.—Southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance, and including all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.

West coast, Prince of Wales Island.—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

Pack of canned salmon in Alaska in 1935, by districts [1]

District	Coho	Chum	Pink	King	Red	Total	Percentage increase or decrease from 1934
	Cases	*Cases*	*Cases*	*Cases*	*Cases*	*Cases*	
Bristol Bay	223	6, 995	---------	660	231, 014	238, 892	−86. 51
Port Moller and Herendeen Bay	---------	2, 862	4	175	34, 920	37, 961	−57. 14
Ikatan-Shumagin Islands	11, 297	175, 340	266, 144	3, 741	74, 412	530, 934	−24. 00
Chignik	1, 611	17, 027	19, 504	127	60, 808	99, 077	−40. 59
Kodiak-Afognak Islands	6, 753	42, 130	534, 083	350	119, 720	703, 036	+7. 22
Cook Inlet	14, 977	14, 400	22, 506	18, 863	104, 694	175, 440	−31. 69
Prince William Sound	3, 447	53, 226	201, 756	621	16, 096	275, 146	−39. 26
Copper and Bering Rivers	9, 376	---------	9	760	8, 453	18, 598	−80. 72
Yakutat and Dry Bay	15, 766	148	4, 966	2, 081	20, 006	42, 967	−27. 73
Icy Strait-Lynn Canal	16, 152	76, 562	185, 700	2, 707	60, 601	341, 722	−30. 71
Chatham Strait-Frederick Sound	16, 585	154, 018	335, 735	5, 801	9, 759	521, 898	−21. 65
Sumner Strait-Dixon Entrance	56, 474	202, 963	1,406,122	519	58, 324	1, 724, 402	+19. 47
West coast, Prince of Wales Island	37, 516	107, 257	267, 537	---------	10, 739	423, 049	−33. 17
Total	190, 177	852, 928	3,244,066	36, 405	809, 546	5, 133, 122	−31. 39

[1] Pack reduced to the basis of forty-eight 1-pound cans per case.

MILD CURING

The output of mild-cured salmon in 1935 showed a substantial increase over that of the preceding year and was the largest since 1930. As usual, the bulk of the product was put up in southeast Alaska. In the western district operations were again carried on at the mouth of the Yukon River, but the commercial catch there was exceptionally light. Small outputs were prepared also on the Kuskokwim River and at Cordova.

The usual registration of trolling boats in southeast Alaska was not undertaken by the Bureau in 1935. It was estimated, however, that the number operated was 10 percent more than in the preceding year.

Twenty-four plants were engaged in the industry, and 1,465 persons were employed, as compared with 22 plants and 1,281 persons in 1934.

The total production of mild-cured salmon was 4,442,400 pounds, valued at $873,693, an increase of 909,600 pounds in quantity and $257,582 in value over the previous year.

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1935

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	991	1	1	993
Natives	153	2	21	176
Chinese	2			2
Filipinos	12			12
Mexicans	2			2
Total	1,160	3	22	1,185
Shoresmen:				
Whites	175		3	178
Natives	4	2	27	33
Total	179	2	30	211
Transporters:				
Whites	66		1	67
Natives			2	2
Total	66		3	69
Grand total	1,405	5	55	1,465
Wages paid shoresmen	$86,223	$190	$3,310	$89,723
Wages paid transporters	$27,003		$404	$27,407
OPERATING UNITS				
Plants:				
Shore	16		4	20
Floating—				
Power vessel		1		1
Net tonnage		14		14
Barges	3			3
Net tonnage	720			720
Total plants operated	19	1	4	24
Vessels:				
Power, over 5 tons	241		3	244
Net tonnage	2,031		68	2,099
Launches	610	1		611
Power dories			2	2
Gill-net boats			6	6
Rowboats and skiffs	116	2	6	124
Lighters and scows	12	1	3	16
Houseboat	1			1
Apparatus:				
Gill nets		2	21	23
Fathoms		400	910	1,310
Lines	3,523			3,523
Wheels			4	4

Products of Alaska salmon mild-curing industry in 1935

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	[1] 293,600	$32,478	[2] 8,000	$820			[3] 301,600	$33,298
Chum, or keta	38,400	2,347					[4] 38,400	2,347
King, or spring	[5] 3,976,000	822,778	[6] 12,000	1,550	[7] 114,400	$13,720	[8] 4,102,400	838,048
Total	4,308,000	857,603	20,000	2,370	114,400	13,720	4,442,400	873,693

[1] 367 tierces.
[2] 10 tierces.
[3] 377 tierces.
[4] 48 tierces.
[5] 4,970 tierces.
[6] 15 tierces.
[7] 143 tierces.
[8] 5,128 tierces.

PICKLING

Operations in the salmon-pickling industry since 1930 have been marked by a striking variation between the odd and even years. This continued in 1935, when the production was more than double that for 1934, although it fell somewhat short of the quantity reported for other recent odd years.

In the western district, which produced about 60 percent of the total output, operations were carried on by five plants in the Bristol Bay area, of which two were primarily engaged in the canning industry. In addition, the floating plant *Anvil*, of the Davis Fisheries, Inc., packed salt salmon at the mouth of the Kuskokwim River, and there was a small production on the Yukon River and at Dutch Harbor. A considerable number of small plants again operated in the central district, chiefly off the south coast of the Alaska Peninsula from Sanak Island to Kodiak Island, and on Cook Inlet and Prince William Sound. Some pickled salmon was also put up in southeast Alaska.

One hundred and twenty-three persons were employed in the industry—an increase of 92 over the number reported for the previous year. The total output was 896,175 pounds, valued at $95,158, as compared with 387,450 pounds valued at $28,987 in 1934.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1935

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	3	34	23	60
Natives		8	2	10
Total	3	42	25	70
Shoremen:				
Whites		2	38	40
Natives		3	10	13
Total		5	48	53
Grand total	3	47	73	123
Wages paid shoremen		$969	$22, 642	$23, 611
OPERATING UNITS				
Plants:				
Shore	2	23	3	28
Floating—				
Power vessels		1	1	2
Net tonnage		14	276	290
Total plants operated	2	24	4	30
Vessels:				
Power, over 5 tons	3	2		5
Net tonnage	24	17		41
Launches		7	1	8
Power dories		11		11
Gill-net boats	4	2	8	14
Seine skiffs		19		19
Rowboats and skiffs		19	3	22
Lighters and scows	1	3		4
Houseboat		1		1
Apparatus:				
Beach seines		22		22
Fathoms		1, 495		1, 495
Gill nets	9	23	24	56
Fathoms	300	660	2, 725	3, 685
Lines		2		2

Products of Alaska salmon-pickling industry in 1935

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	41, 600	$4, 010	143, 100	$13, 479	48, 800	$5, 368	233, 500	$22, 857
Chum, or keta	----------	--------	1, 900	290	5, 500	480	7, 400	770
King, or spring	----------	--------	17, 000	3, 266	104, 875	9, 882	121, 875	13, 148
Red, or sockeye	7, 600	898	150, 800	18, 797	375, 000	38, 688	533, 400	58, 383
Total	49, 200	4, 908	312, 800	35, 832	534, 175	54, 418	896, 175	95, 158

FRESH SALMON

Sixteen plants in southeast Alaska and 1 in the central district reported an output of fresh salmon incidental to other fishery operations. The total products amounted to 2,951,636 pounds, valued at $168,427, as compared with 1,385,789 pounds valued at $69,837 in 1934—an increase of 113 percent in quantity and 141 percent in value. These figures do not include salmon for fox feed, which is shown under miscellaneous salmon products.

Products of the Alaska fresh-salmon industry in 1935

Species	Pounds	Value
Coho, or silver	688, 008	$35, 342
King, or spring	2, 262, 959	133, 042
Red, or sockeye	669	43
Total	2, 951, 636	168, 427

FREEZING

The freezing of salmon in Alaska was carried on only in the southeastern district, primarily in conjunction with the mild-curing industry. One cold-storage plant whose chief product was frozen salmon gave employment to 17 white shoresmen. The total output was 4,266,834 pounds, valued at $270,178, as compared with 5,316,574 pounds valued at $334,812 in 1934—a decrease of about 20 percent in quantity and 19 percent in value.

Salmon that were frozen for use as bait in the halibut fishery are not included in the above figures but are shown under miscellaneous salmon products.

Products of the Alaska frozen-salmon industry in 1935

Species	Pounds	Value
Coho, or silver	2, 086, 540	$116, 162
Chum, or keta	237, 978	4, 917
Pink, or humpback	26, 350	791
King, or spring	1, 915, 966	148, 308
Total	4, 266, 834	270, 178

DRY-SALTED, DRIED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

Three operators in southeast Alaska and one in the central district reported the dry-salting of salmon, the total production amounting to 59,900 pounds valued at $6,433. Five white fishermen and one white shoresman were employed in these operations. Other miscellaneous products in these districts, incidental to salmon canning and mild-curing for the most part, consisted of 45 cases of smoked and canned king salmon valued at $225; 17,000 pounds of caviar valued at $2,100; 240,930 pounds of frozen salmon for use as bait in the halibut fishery, valued at $1,205; and 8,400 pounds of fresh salmon for fox feed, valued at $42.

In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 1,436,000 pounds of chum salmon were dried, valued at $114,960. Fifteen whites and six hundred and fifty natives engaged in the fishery, and the apparatus used consisted of 293 wheels, 484 gill nets of 7,669 fathoms, 2 dories, and 50 rowboats and skiffs.

Production of dry-salted, dried, and other miscellaneous salmon products in Alaska in 1935

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted:								
Coho, or silver	12,300	$1,276	21,800	$1,962	-----	-----	34,100	$3,238
King, or spring	2,000	220	-----	-----	-----	-----	2,000	220
Red, or sockeye	23,800	2,975	-----	-----	-----	-----	23,800	2,975
Total	38,100	4,471	21,800	1,962	-----	-----	59,900	6,433
Dried: Chum or keta	-----	-----	-----	-----	1,436,000	$114,960	1,436,000	114,960
Smoked and canned: King, or spring	1,080	225	-----	-----	-----	-----	1,080	225
Frozen for bait: Chum, or keta	240,930	1,205	-----	-----	-----	-----	240,930	1,205
Fresh for fox feed: Pink, or humpback	-----	-----	8,400	42	-----	-----	8,400	42
Caviar	17,000	2,100	-----	-----	-----	-----	17,000	2,100
Grand total	297,110	8,001	30,200	2,004	1,436,000	114,960	1,763,310	124,965

BYPRODUCTS

The manufacture of salmon meal and oil was carried on by a byproducts plant in southeast Alaska that gave employment to 14 white shoremen and 2 white transporters, and by a salmon cannery in the central district as an adjunct to its canning operations. The total production was 1,171,900 pounds of fertilizer, valued at $16,763, and 49,000 gallons of oil, valued at $15,200, as compared with 1,015,560 pounds of fertilizer valued at $15,233 and 33,720 gallons of oil valued at $13,701 in 1934—an increase of 15 percent in the output of fertilizer and 45 percent in the amount of oil.

HERRING

A new peak was reached in 1935 in the volume of Alaska herring products, the total amounting to 81,147,693 pounds, as compared with the previous record output of 77,064,011 pounds in 1925. In the intervening decade there had been, notwithstanding some marked fluctuations, a general upward trend in the production of meal and oil. This upward trend was continued in 1935, chiefly through the establishment of reduction plants for the first time in the Kodiak area to enable the utilization of that portion of the catch consisting of fish too small for satisfactory curing.

The total output of Scotch-cured herring in 1935, although far short of the 1925 production, was the largest for any year since 1928 and more than double that of 1934. All the major districts contributed to the gain, but the chief increase was in the Prince William Sound and Kodiak areas. In southeast Alaska 2,187,000 pounds of Scotch-cured herring were produced, as compared with 2,137,075 pounds in the preceding year. The increase in the Prince William Sound area was from 1,790,750 pounds in 1934 to 5,626,500 pounds in 1935, in the Kodiak area from 1,455,875 pounds to 3,696,950 pounds, and in the Aleutian Islands region from 2,015,375 pounds to 3,404,675 pounds. Small quantities of cured herring were prepared at Cook Inlet, Chignik, and Golovin Bay.

Of the 24 concerns that handled herring in southeast Alaska, 6 were cold-storage plants that froze herring for bait and 8 were engaged solely in the production of bait herring. The following companies operated saltery and reduction plants in this district:

Arentsen & Co	Big Port Walter.
Atlas Packing Corporation	Deep Cove.
Buchan & Heinen Packing Co	Port Armstrong.
Chatham Strait Fish Co	New Port Walter.
Northwestern Herring Co	Port Conclusion.
Port Herbert Packing Co	Port Herbert.
Richmond Fisheries, Inc	Red Bluff Bay.
Storfold & Grondahl Packing Co	Washington Bay.

In central Alaska two floating salteries—the *Donna Lane* of the Oceanic Fisheries Co., Inc., and a scow of the Patmos Packing Co.—were used in both the Prince William Sound and Kodiak areas. The Southwestern Herring Co. leased the plant at Iron Creek that had been operated in 1934 by the Apex Fish Co., and the latter built a new plant at Port Wakefield, 3 miles east of Iron Creek, on Raspberry Island. The output of bait in the Kodiak region was the smallest since 1930, attributable to a disappointing early run in Uganik Bay. The more important operators in the central district were as follows:

Salteries:	
David Buvick	Shuyak Strait.
Oceanic Fisheries Co., Inc	Floating plant.
Patmos Packing Co	Do.
San Marco Fish Co	Amee Bay and floating plant.
Sword & Hofstad	Floating plant.
Saltery and reduction plants:	
Apex Fish Co	Port Wakefield.
Chatham Strait Fish Co	Crab Bay.
Evans Bay Packing Co., Inc	Port Benny.
George Hogg & Co	Blue Fox Bay.
Johnson Fisheries Co	Thumb Bay.
Perfection Fisheries, Inc	Do.
San Juan Fishing & Packing Co	Port San Juan.
Shepard Point Packing Co	Port Ashton.
Southwestern Herring, Inc	Iron Creek.

With the exception of a small production at Golovin Bay, all herring packing in the western district was at Dutch Harbor and Unalaska, the operators generally being the same as in the preceding year. The Davis Fisheries, Inc., which was engaged primarily in mild-curing salmon off the mouth of the Kuskokwim River, prepared dry-salted herring aboard the floating plant *Anvil* at Dutch Harbor. Other important operators in the district were as follows, all of whom packed Scotch-cured herring, while many put up bloater stock or dry-salted herring also:

Austnes & Rod	Unalaska.
Campbell & Dougal	Dutch Harbor.
Odin Isaacson	Unalaska.
Ed Jacobsen & Co	Dutch Harbor.
Jordan Colombos Lambides	Do.
Northwestern Herring Co	Do.
Olaf Olsen	Unalaska.
Peterson & Jorgensen	Dutch Harbor.
Polar Packing Co	Unalaska.
T. A. Roth	Do.

Studies concerning the life history and fluctuations in the abundance of the herring populations in Alaska were continued by Edwin H. Dahlgren, chiefly in the Chatham Strait fishing area. New developments in the tagging of herring for the purpose of tracing their migrations have made possible the partial determination of the mortality of this species as affected by natural conditions as well as the drain of the fishery.

STATISTICAL SUMMARY

There were 1,339 persons engaged in the herring industry in 1935, as compared with 885 in 1934. The number of plants increased from 26 to 32. Products of the fishery were valued at $2,374,092, an increase of $771,068, or 48 percent over 1934, when the total value was $1,603,024. Scotch-cured herring increased from 7,409,200 pounds valued at $445,476 to 14,942,750 pounds valued at $808,064, or about 102 percent in quantity and 81 percent in value. Herring for bait decreased from 6,391,950 pounds valued at $52,259 to 5,959,475 pounds valued at $50,512, or 7 percent in quantity and 3 percent in value. Meal increased about 8 percent in quantity but decreased 19 percent in value, and oil increased 2 percent in quantity and 76 percent in value.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1935

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	354	196	25	575
Natives		3	4	7
Total	354	199	29	582
Shoresmen:				
Whites	277	352	57	686
Natives		26	29	55
Total	277	378	86	741
Transporters:				
Whites		14	2	16
Grand total	631	591	117	1,339
Wages paid shoresmen	$113,102	$161,073	$29,984	$304,159
Wages paid transporters		$7,397	$560	$7,957
OPERATING UNITS				
Plants:				
Shore	8	9	11	28
Floating—				
Power vessel		1		1
Net tonnage		1,597		1,597
Sailing vessel		1		1
Net tonnage		1,068		1,068
Scows		2		2
Total plants operated	8	13	11	32
Vessels:				
Power, over 5 tons	51	32		83
Net tonnage	1,701	944		2,645
Launches	3	2	3	8
Power dories			6	6
Gill-net boats			7	7
Seine skiffs	24	19		43
Other rowboats and skiffs	20	10	6	36
Scow	1			1
Pile drivers		2		2
Apparatus:				
Purse seines	54	26		80
Fathoms	8,907	4,400		13,307
Beach seines		2		2
Fathoms		90		90
Gill nets			34	34
Fathoms			1,510	1,510
Pound seines	11	1		12
Pounds	5	6		11

Products of Alaska herring industry in 1935

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait	2,059,055	$22,059	273,750	$2,665			2,332,805	$24,724
Frozen, for bait	3,626,670	25,788					3,626,670	25,788
Frozen, for food			40,000	1,200			40,000	1,200
Pickled, for food:								
Scotch cure	2,187,000	116,612	9,343,325	543,055	3,412,425	$148,397	14,942,750	808,064
Norwegian cure			4,000	360			4,000	360
Roused for food (bloater stock)			108,150	3,245	1,211,320	31,548	1,319,470	34,793
Spiced	1,000	160					1,000	160
Dry salted					314,775	7,551	314,775	7,551
Meal	18,108,962	216,744	12,014,194	140,984			30,123,156	357,728
Oil	[1] 16,797,975	669,385	[2] 11,645,092	444,339			[3] 28,443,067	1,113,724
Total	42,780,662	1,050,748	33,428,511	1,135,848	4,938,520	187,496	81,147,693	2,374,092

[1] 2,239,730 gallons.

[2] 1,552,679 gallons.

[3] 3,792,409 gallons.

HALIBUT

A program for controlling production was again adopted by the halibut fleet, whereby limitations were placed on the catch per man per trip, the amounts varying according to the fishing area and the port of landing. In addition, each vessel was required to remain in port for a certain number of days between trips. Although the results were not all that had been expected, the effect of this control program on market conditions was of material benefit to the industry.

Under the regulations of the International Fisheries Commission the legal fishing season for halibut opened on March 1, but most of the fishermen did not begin operations until April 10, partly because they were endeavoring to secure a minimum price guarantee on their catch and partly because of the large carryover of frozen halibut from the 1934 season. As a result of the delay in starting, operations in the fall extended later than usual: the quota fixed by regulation for area no. 2 was reached and that area was closed on September 6; in area no. 3 the catch was somewhat short of the quota when fishing was closed on December 26. No quotas were established for areas 1 and 4, where the closing dates were the same as for areas 2 and 3, respectively.

Halibut livers were again in demand for pharmaceutical use, and the price was almost double that of the previous year.

Scientific studies of the Pacific halibut were continued by the International Fisheries Commission under the direction of Dr. William F. Thompson. The vessel *Paragon* was chartered in the winter of 1934–35 to carry on investigations off the coast of British Columbia. From the data thus collected it is possible to determine the trend of the fishery and the effectiveness of the regulations in improving the banks.

STATISTICAL SUMMARY

Four hundred and twenty-five persons were employed in the Alaska halibut fishery in 1935—a decrease of 177 from the number reported for the preceding year, and products amounted to 9,805,680 pounds, valued at $607,845. This production represents the total fares of the Alaska halibut fleet, which comprises all American vessels landing more than one-half of their catch in Alaska or British Columbia ports rather than in the States. Landings of halibut in Alaska totaled 6,382,681 pounds valued at $377,123, which include 6,000 pounds valued at $500 landed by Canadian vessels. In 1934 the landings of the Alaska fleet were 13,221,338 pounds valued at $804,785, and landings in Alaska amounted to 7,151,669 pounds valued at $398,337. Fares of the Alaska fleet in 1935, therefore, decreased 26 percent in quantity and 24 percent in value from 1934. The landings in Alaska ports in 1935 decreased about 11 percent in quantity and 5 percent in value from the preceding year.

These statistics were compiled from data collected by the International Fisheries Commission and by agents of the Bureau. The amount of halibut livers landed by the Alaska fleet was not reported, but it was stated that there were altogether about 924,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $375,000, landed at Alaska and Pacific coast ports during 1935 by American vessels.

Persons engaged, wages paid, and operating units, Alaska halibut industry, 1935

Items	Total	Items	Total
PERSONS ENGAGED		OPERATING UNITS	
Fishermen: Whites	404	Vessels:	
Shoresmen: Whites	21	Power, over 5 tons	78
		Net tonnage	1,072
Total	425	Launches	29
		Skates of lines	1,886
Wages paid shoresmen	$5,900		

Products of the Alaska halibut fishery in 1935

Products	Pounds	Value
Fresh (including local)	5,936,134	$363,525
Frozen	3,869,546	244,320
Total	9,805,680	607,845

COD

A limited amount of cod fishing was carried on in 1935 from shore stations in the Shumagin Islands region and at Unalaska, partly in connection with salmon pickling and herring operations. Ten persons, whites, were engaged in the industry, a decrease of 44 from the number reported for the previous year. Products of the shore fishery were as follows: 106,808 pounds of dry-salted cod, valued at $4,555; 32,789 pounds of pickled cod, valued at $1,130; and 8,140 pounds of stockfish, valued at $1,128—a total of 147,737 pounds, valued at $6,813, as compared with 492,905 pounds, valued at $19,906, in 1934.

There were 5 sailing vessels in the Bering Sea fleet, the products of which are not included with the Alaska fisheries output because the vessels operate from and land their fares in ports of the Pacific Coast States. Of these, the *Sophie Christenson* (570 tons) was operated by the Pacific Coast Codfish Co., the *Azalea* (365 tons) and the *Wawona* (413 tons) were operated by the Robinson Fisheries Co., and the *Louise* (328 tons) and *William H. Smith* (496 tons) by the Union Fish Co.

Products of the offshore fishery were 4,422,411 pounds of dry-salted cod, valued at $199,027, and 16,926 pounds of tongues, valued at $1,162—a total of 4,439,337 pounds valued at $200,189, as compared with 4,942,376 pounds valued at $213,366 in 1934. The offshore fleet employed 202 persons, or 3 more than in the previous year.

WHALES

The American Pacific Whaling Co. again operated its plants at Port Hobron and Akutan, using seven steam whalers during the season. Employment was given to 238 persons, of whom 216 were whites and 22 natives.

Three hundred and ninety-four whales were taken, consisting of 94 finback, 141 humpback, 87 sulphur bottom, 70 sperm, and 2 right whales. This is a decrease of 71 from the number taken in 1934.

Products of the whale fishery were 833,299 gallons of whale oil, valued at $312,560; 192,850 gallons of sperm oil, valued at $46,284; 852 tons of fertilizer from meat, valued at $21,800; and 487 tons of bone fertilizer, valued at $9,740—a total value of $390,384, as compared with $251,005 in 1934.

CLAMS

Although operations in the clam industry in the Seward-Katalla district were adversely affected by labor difficulties during the spring, the pack limit of 552,000 pounds for the first 6 months, as specified by the regulations for that area, was reached on June 19, and the summer closed season extended from that date through August 15. Unfavorable market conditions curtailed the fall pack however, so that the production in the district was considerably less than in the previous year.

A study of the condition of the razor clam fishery in the vicinity of Cordova by Seton H. Thompson and Dr. F. W. Weymouth, published as Investigational Report No. 29, shows the clam stock on the beds in this region to be well able to withstand the drain of commerical fishing under existing regulations.

In the Kodiak area there was a decided increase in production over that for 1934, due to the resumption of operations at Kukak Bay. Of the total output of clams in Alaska in 1935, approximately 65 percent came from the vicinity of Cordova, 27 percent from the Kodiak area, and 4 percent each from Cook Inlet and southeast Alaska.

Fifteen firms in central Alaska handled clams, chiefly in conjunction with other branches of the fisheries. Among the more important operators were the W. R. Gilbert Co., Inc., Pioneer Canneries, Inc., Scotty's Packing Co., Strand-Jensen Fisheries Co., Alaska Icepak Corporation, Cordova Fisheries Co., Inc., E. A. Haltness, and S. E. Smith Packing Co., in Cordova and vicinity; the Enterprise Packing Co. and Ninilchik Packing Co. on Cook Inlet, and the Surf Canneries at Kukak Bay. In southeast Alaska a small quantity of hard-shell clams was packed by the crab cannery of V. L. Broadway & Co. at Wrangell and by the salmon cannery of Lane Brothers at Moira Sound.

The number of persons employed in the clam industry in 1935 was 448, of whom 389 were whites, 55 natives, and 4 Filipinos. The output consisted of 34,259 cases, containing 889,302 pounds (857,742 pounds of razor clams and 31,560 pounds of butter clams), valued at $197,581. This is an increase of about 14 percent in quantity and 5 percent in value as compared with figures for 1934, when clam products amounted to 782,388 pounds, valued at $188,666.

Products of the Alaska clam industry in 1935

Item	Cases	Pounds	Value
Minced:			
½-pound cans (48 to case)	24, 793	595, 032	$137, 315
10-ounce cans (48 to case)	8, 347	250, 410	53, 900
1-pound cans (48 to case)	177	8, 496	1, 433
2-pound cans (24 to case)	490	23, 520	2, 450
Whole:			
½-pound cans (48 to case)	87	2, 088	378
10-ounce cans (48 to case)	148	4, 440	1, 234
1-pound cans (48 to case)	42	2, 016	321
10-pound cans (6 to case)	25	1, 500	250
Juice:			
½-pound cans (24 to case)	150	1, 800	300
Total	34, 259	889, 302	197, 581

SHRIMP

Three plants in southeast Alaska—one at Petersburg and two at Wrangell—were again engaged primarily in the shrimp industry, operating on about the same scale as in the preceding year. A small quantity of shrimp was also produced by a company in the Cordova district, whose chief operations were in the crab fishery.

There were 172 persons engaged in the industry, of whom 50 were whites, 80 natives, 20 Japanese, and 22 Filipinos. Products consisted of 371,885 pounds of shrimp meat, valued at $126,649; 9,777 pounds of fresh shrimp in shell, valued at $1,407; 1,629 pounds of raw frozen shrimp, valued at $652; and 576 pounds of canned shrimp meat (24 cases of ½-pound cans, 48 to the case) valued at $192—a total of 383,867 pounds, valued at $128,900. Comparable figures for 1934 show a production of 381,456 pounds, valued at $120,111.

CRABS

Eleven companies handled crabs in Alaska in 1935, the same number as in the preceding year. The more important operators in southeast Alaska were the Alaskan Glacier Sea Foods Co. at Hoonah and Petersburg, the latter plant being used primarily in the shrimp fishery; the Stikine Sea Foods Co., at Wrangell, also devoted chiefly to the production of shrimp; V. L. Boardway & Co., at Wrangell; and Kayler-Otness, Inc., at Petersburg. In the central district the principal operators were the Alaska Icepak Corporation, primarily engaged in salmon canning, the Gulf Packing Co., and the Northern Sea Foods Co., all at Cordova.

The production of canned crabs declined sharply from that of 1934, due in part to the utilization of a larger proportion of the catch for cold-packing. The regulations providing for a 2-month closed season in the summer, effective for the first time in 1935, also curtailed the output to some extent.

One hundred and sixty-seven persons were engaged in the industry, of whom 105 were whites, 60 natives, 1 Filipino, and 1 Mexican. Products consisted of 324,370 pounds canned (9,711 cases of ½-pound cans, 1,731 cases of 6½-ounce cans, and 1,160 cases of 1-pound cans, 48 to the case; and 39 cases of 2-pound cans, 24 to the case), valued at $106,832; 137,906 pounds of cold-packed meat, valued at $53,607; and 1,436 dozen whole crabs in the shell, valued at $2,889. With the exception of 960 pounds of canned king crabs (40 cases of ½-pound cans, 48 to the case) valued at $280, the entire production was of Dungeness crab. The total output of crab products in 1935 was 499,538 pounds, valued at $163,328, as compared with 643,148 pounds valued at $207,663 in 1934, a decrease of 22 percent in quantity and 21 percent in value.

JAPANESE VESSELS IN BERING SEA

Two Japanese floating plants carried on crab-canning operations in Bering Sea waters in 1935—the *Taihoku Maru* (8,253 tons), which had engaged in similar activities in 1930, 1933, and 1934, and the *Ryokai Maru* (4,643 tons), operating for the first time in this area. The former vessel, used primarily in the reduction of fish meal, was accompanied by 3 accessory trawlers of 398 tons each and 8 sea-bottom-seine motorboats of 88 tons each. Three accessory motorboats, of from 44 to 80 tons each, were with the *Ryokai Maru*.

The training ship *Hakuyo Maru*, of the Imperial Fisheries Institute, again made a trip to Bering Sea and Bristol Bay with a group of students for practice in deep-sea fishing. The vessel did not call at any Alaska ports.

The Japanese scouting ship *Hakuho Maru*, of the Department of Agriculture and Forestry, also made a cruise to Bering Sea, to investigate the migration routes of fur seals. Katsumi Miyataka, the department's fur-seal investigator, was aboard. En route from Japan the *Hakuho Maru* was at Attu Island for a few days in June. From July 10 to July 17 it was anchored off East Landing, St. Paul Island, and from July 18 to July 20, off St. George Island. Mr. Miyataka and others visited both islands to observe fur-seal and fox life.

TROUT

Small amounts of Dolly Varden and steelhead trout were handled in southeast Alaska at plants engaged primarily in other branches of the fisheries. The reported products were as follows: Dolly Vardens, 16,470 pounds fresh, valued at $1,135, and 6,895 pounds frozen, valued at $450; steelheads, 9,517 pounds frozen, valued at $820. The total output of both species was 32,882 pounds valued at $2,405, as compared with 67,613 pounds valued at $5,017 in 1934.

MISCELLANEOUS FISHERY PRODUCTS

Fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed at ports of Alaska and British Columbia and at Seattle. Such products landed in Alaska in 1935 were as follows: Sablefish, 80,516 pounds fresh, valued at $4,428; 478,769 pounds frozen, valued at $18,093; and 6,161 pounds pickled, valued at $318; rockfish, 5,344 pounds frozen, valued at $189; and flounders, 250,000 pounds fresh, for mink feed, valued at $3,750.

FUR-SEAL INDUSTRY

PRIBILOF ISLANDS

GENERAL ADMINISTRATIVE WORK

In 1935, 57,296 fur-seal skins were taken at the Pribilof Islands. This is an increase of 3,826 skins over the number taken in 1934, and constitutes the largest take at the islands in 46 years. As in 1934, 85 percent of these skins were shipped to the Fouke Fur Co. at St. Louis, Mo., and 15 percent were delivered to a representative of the Canadian Government at Seattle as the share of Great Britain in accordance with the terms of the treaty of July 7, 1911. Settlement of the Japanese share of 15 percent, due under the same treaty, is made from the net proceeds of the sale of dressed and dyed sealskins.

Sealing and other work at the islands was carried on largely by the natives under supervision of white employees. As wards of the Government, the natives received in exchange for their services all the necessaries of life, including food, clothing, housing, medical attention, and educational facilities, and in addition small cash payments on a piecework basis.

A number of improvements were made in buildings, roads, and equipment to enable proper handling of the annually increasing take of sealskins. Of particular importance was the modernization of the byproducts plants which was put in operation for the first time in 1935. A much-needed new school building on St. George Island was completed during the year.

Coast Guard cutters accompanied the fur-seal herd northward from a point off the southern boundary of the State of Washington to the Pribilof Islands, and continued to patrol in Bering Sea while the herd was in those waters. A patrol was maintained off the Washington coast and in the vicinity of Sitka, Alaska, by vessels of the Bureau of Fisheries. Collections of seal stomachs were made at these places to provide information as to the food of fur seals during their migration.

The U. S. S. *Sirius* was detailed by the Navy Department to make a round trip from Seattle to the Pribilof Islands for the purpose of transporting the principal annual shipment of supplies and returning the season's take of sealskins. The Bureau's vessel *Penguin* also made several voyages from Seattle during the year, carrying passengers and perishable freight to the islands.

TRANSPORTATION OF SUPPLIES

On July 25 the U. S. S. *Sirius*, naval supply vessel, sailed from Seattle for the Pribilof Islands with a cargo of supplies, consisting of 1,212 tons of general freight and 67,645 board feet of lumber for St. Paul Island and 613 tons of freight and 174,250 board feet of lumber for St. George Island, a total of 1,825 tons of miscellaneous cargo and 241,895 board feet of lumber. Other supplies were transported to St. Paul Island for the Navy Department, and to the Aleutian Islands for the Navy Department and the Coast and Geodetic Survey. St. Paul Island was reached on August 4.

The discharge of cargo and loading of outgoing freight were completed in 10 days. The latter consisted of 480 barrels of sealskins, 126 barrels of blubber, 189 empty oil drums, 1,193 sacks of seal meal, and 5 live fur seals from St. Paul Island, and 233 barrels of sealskins and 142 empty oil drums from St. George Island. The *Sirius* departed from St. Paul Island on August 14 and arrived at Seattle on August 23.

Additional supplies were shipped to the islands on each of the five trips of the *Penguin* from Seattle.

POWER VESSEL "PENGUIN"

The power vessel *Penguin* made five round-trip voyages from Seattle to the Pribilof Islands in the calendar year 1935, carrying shipments of supplies, chiefly perishable foodstuffs, and transporting employees engaged in fur-seal work. It was used also in the performance of inter-island work during the sealing season, and in transporting native workmen from villages along the Alaska Peninsula to the islands for temporary employment during the summer and returning them to their homes in the fall.

Extensive repairs were made to the *Penguin* at the beginning of the year and departure on the first voyage was delayed until February 16.

The dates of the voyages north were as follows: February 16–28, May 1–12, June 10–21, August 24 to September 5, and October 10–24. Return trips from the Pribilofs to Seattle covered the following periods: March 5–25, May 18–28, August 4–13, September 12–22, and October 30 to November 14.

In addition to the shipments of supplies on these voyages, transportation was afforded 121 passengers for the Bureau, 18 for the Navy Department, 2 for the Coast Guard, and 1 for the Office of Indian Affairs. Similar service was extended to a number of unofficial travelers.

The *Penguin* cruised a total of 27,708 nautical miles during the year.

ROADS

St. Paul Island.—Three thousand feet of new road toward Reef rookery, on St. Paul Island, was completed, and considerable work was done on resurfacing and widening roads previously built. The improvement of the old roads included also the elimination of curves as much as possible and the filling in of swales to make a more level surface. Extensive repairs were made after the storm of October 7, as the high tide washed out the road in a number of places, particularly on that part of the Northeast Point road between the village and Icehouse Lake.

St. George Island.—On St. George Island, 5,360 feet of plank road was laid during the year.

BUILDINGS

St. Paul Island.—Only minor improvements were undertaken on St. Paul Island during the season. Sod was put around the dispensary, hospital, and three cottages for white employees. Cement sidewalks were also built around the cottages, and a walk between the dispensary and hospital. Repairs were made on the new dock, which was damaged by the high tide in early October.

St. George Island.—The new schoolhouse on St. George Island, which was begun in 1933, and the school sewer system were completed. A watch house was built at Staraya Artil.

BYPRODUCTS PLANT

The byproducts plant at St. Paul Island, which had been rebuilt and equipped with modern machinery in 1931, was overhauled and put in operation during the 1935 sealing season for the utilization of fur-seal carcasses. Considerable difficulty was experienced in making the machinery operate properly after being idle for 4 years. One of the presses was found to be defective, and operations accordingly were much curtailed.

Approximately 14,000 carcasses and 395,200 pounds of blubber were utilized by the plant and yielded 155,254 pounds of seal meal and 18,394 gallons of seal oil. About 6,300 pounds of meal and 106 gallons of oil were retained at the islands for use as fox feed. Seventy gallons of grease and 600 gallons of foots, or residual oil, remained in the settling tanks, some of which also may be used for fox feed. Fifty gallons of oil were used as samples and for experimental purposes.

Of the remaining meal, 1,030 pounds were shipped to Seattle on the *Penguin* in August for experimental use as fish food. The balance of

147,924 pounds was shipped to Seattle on the *Sirius*, and distributed to the Bureau's hatcheries throughout the country, where it has proved to be a nutritious food for young fish.

All oil not used as samples or for experimental purposes or for fox feed was shipped to Seattle on the *Penguin* in October. This shipment consisted of 13,922 gallons of No. 1 oil and 4,316 gallons of No. 2 oil, a total of 18,238 gallons, which was sold to the highest bidder at 27 cents per gallon. The proceeds of this sale, amounting to $4,924.26, were covered into the United States Treasury.

NATIVES

CENSUS

On December 31, 1935, the total native population on St. Paul Island was 247, including 20 persons who were temporarily absent from the island. There were 11 births and 4 deaths during the year and 4 permanent departures, leaving a net increase of 3 in the population.

The census of St. George Island on December 31, 1935, showed a population of 161 natives, an increase of 3 for the year, there having been 5 births and 2 deaths.

The total population of both islands at the end of 1935 was 408, an increase of 6 over the total for 1934.

MEDICAL SERVICE

Two physicians were stationed at the islands throughout the year—one on St. Paul Island and one on St. George Island—to look after the health of the natives and of Government employees and their families. The medical aid included periodic physical examinations of all school children and instructions in proper care of the teeth and oral hygiene. In general, the health of the natives was good, and sanitary conditions in the villages were satisfactory.

SCHOOLS

Schools for the native children are maintained on St. Paul and St. George Islands, two teachers being employed on each island. Instruction is confined to the elementary branches, including some manual training and home economics.

The 1934–35 school year on both islands began on September 17, 1934, and continued for 8 months, the school on St. Paul Island closing on May 17, and that on St. George Island on May 15, 1935.

On St. Paul Island 20 boys and 13 girls were enrolled in the junior school and 12 boys and 19 girls in the senior school, a total of 64 pupils. On St. George Island 10 boys and 10 girls were in the junior school and 10 boys and 14 girls in the senior school, a total of 44 pupils.

SAVINGS ACCOUNTS

The Commissioner of Fisheries, as trustee, had custody during the year of certain funds belonging to Pribilof Islands natives. These funds were deposited in the Washington Loan & Trust Co., Washington, D. C., where interest, compounded semiannually, was received at the rate of 2½ percent. A summary of the trust account for the year 1935 is shown in the statement that follows:

On hand Jan. 1, 1935	$5,760.64
Interest earned from Jan. 1 to Dec. 31, 1935	135.64
	5,896.28
Withdrawn by natives	875.23
On hand Dec. 31, 1935	5,021.05

An itemized statement of the funds, showing the individual accounts follows:

Funds of the Pribilof Islands natives in the custody of the United States Commissioner of Fisheries, as trustee, Dec. 31, 1935

Gromoff, Iuliania	$390.37
Kochutin, Alexandra	1,878.48
Kozloff, Marina	131.03
Lestenkof, Michael	414.86
Merculief, Alexandra	90.51
Merculief, Daniel	503.99
Merculief, Elizabeth	70.14
Merculief, Erena	$648.59
Merculief, George	106.90
Merculief, Tatiana	585.20
Pankoff, Agrippina	200.98
Total	5,021.05

PAYMENTS FOR TAKING FUR-SEAL SKINS

For their work in taking and curing sealskins, the natives of the Pribilof Islands are paid cash at a specified rate per skin. In order that the collective earnings may be equitably distributed, the sealers on each island are divided into classes according to their skill and ability, and the total amount for the island is apportioned among them, each member of a given class receiving an equal share. Small bonuses are paid for special services.

Payments to natives on St. Paul Island in 1935 were at the rate of 60 cents per skin. For the 45,824 sealskins taken, the total payment was $27,494.40, and in addition $180 was paid to two foremen and four mess attendants.

Natives on St. George Island received cash payment at the rate of 65 cents per skin on the take of fur-seal skins in 1935. For the 11,472 sealskins taken, the sum of $7,456.80 was distributed among the various classes of workmen, an extra allowance equal to the payment on 12 skins being given to one of the sealers for his services as company house cook. An additional sum of $100 was paid to two native foremen.

The details of these payments are shown in the following table:

Payments to Pribilof Islands natives for taking fur-seal skins, calendar year 1935

Classification	St. Paul Island			St. George Island		
	Number of men	Share of each	Total	Number of men	Share of each	Total
First class	31	$544.20	$16,870.20	27	$204.75	$5,528.25
Second class	11	471.00	5,181.00	6	162.50	975.00
Third class	7	314.40	2,200.80	2	123.50	247.00
Fourth class	11	249.00	2,739.00	5	90.35	451.75
Fifth class	7	60.60	424.20	3	52.00	156.00
Boys' class	3	26.40	79.20	2	39.00	78.00
Do				1	13.00	13.00
Company house cook					7.80	7.80
Foreman (additional compensation)			60.00			55.00
Do			40.00			45.00
Mess attendants, 4			80.00			
Total	70		27,674.40	46		7,556.80

PAYMENTS FOR TAKING FOX SKINS

The natives were paid $5 in cash for each fox skin taken on the Pribilof Islands in the 1934–35 season. The total payments amounted to $1,000 for the 200 skins taken on St. Paul Island and $4,010 for the 802 skins taken on St. George Island, a total of $5,010.

FUR SEALS

KILLINGS

In 1935, 57,296 fur seals were killed, of which 45,824 were taken on St. Paul Island and 11,472 on St. George Island. Details in regard to the killings are shown in the following tabulations:

Seal killings on Pribilof Islands in 1935

ST. PAUL ISLAND

Date	Serial no. of drive	Hauling ground	Skins secured
June 1	1	Sea Lion Rock (Sivutch)	97
10	2	Polovina	79
19	3	Zapadni and Little Zapadni	261
20	4	Reef and Gorbatch	894
21	5	Polovina	283
22	6	Vostochni and Morjovi	1,086
23	7	Zapadni and Little Zapadni	212
24	8	Tolstoi, Lukanin, and Kitovi	388
25	9	Reef and Gorbatch	1,462
26	10	Polovina and Little Polovina	314
27	11	Vostochni and Morjovi	1,275
28	12	Zapadni	667
29	13	Tolstoi, Lukanin, and Kitovi	429
30	14	Reef and Gorbatch	1,584
July 1	15	Vostochni and Morjovi	904
2	16	Polovina and Little Polovina	277
3	17	Zapadni	584
4	18	Tolstoi, Lukanin, and Kitovi	856
5	19	Reef and Gorbatch	1,973
6	20	Polovina and Little Polovina	418
7	21	Vostochni and Morjovi	3,880
8	22	Zapadni and Little Zapadni	862
9	23	Tolstoi, Lukanin, and Kitovi	1,591
10	24	Reef and Gorbatch	2,287
11	25	Polovina and Little Polovina	735
12	26	Vostochni and Morjovi	2,495
13	27	Zapadni	917
14	28	Tolstoi, Lukanin, and Kitovi	732
15	29	Reef and Gorbatch	1,254
16	30	Polovina and Little Polovina	677
17	31	Vostochni and Morjovi	1,379
18	32	Zapadni and Little Zapadni	1,218
19	33	Tolstoi, Lukanin, and Kitovi	756
20	34	Reef and Gorbatch	1,830
21	35	Polovina and Little Polovina	759
22	36	Vostochni and Morjovi	2,182
23	37	Zapadni and Little Zapadni	522
24	38	Tolstoi, Lukanin, and Kitovi	874
25	39	Reef and Gorbatch	1,646
26	40	Polovina and Little Polovina	284
27	41	Vostochni and Morjovi	1,326
28	42	Zapadni and Little Zapadni	665
29	43	Tolstoi, Lukanin, and Kitovi	500
30	44	Reef and Gorbatch	1,313
31	45	Polovina, Little Polovina, Vostochni, and Morjovi	1,097
		Total	45,824

Seal killings on Pribilof Islands in 1935—Continued

ST. GEORGE ISLAND

Date	Serial no. of drive	Hauling ground	Skins secured
June 3	1	Staraya Artil	29
11	2	North	57
13	3	Zapadni	97
17	4	North and Staraya Artil	129
18	5	East	58
19	6	Zapadni	174
20	7	North and Staraya Artil	71
22	8	East	47
23	9	Zapadni	81
25	10	North and Staraya Artil	368
26	11	East	136
27	12	Zapadni	240
29	13	North and Staraya Artil	291
30	14	East	219
July 1	15	Zapadni	182
3	16	North and Staraya Artil	560
4	17	East	116
5	18	Zapadni	212
7	19	North and Staraya Artil	1,414
8	20	East	368
9	21	Zapadni	138
11	22	North and Staraya Artil	729
12	23	East	261
13	24	Zapadni	153
15	25	North and Staraya Artil	754
16	26	East	326
17	27	Zapadni	75
19	28	North and Staraya Artil	970
20	29	East	164
21	30	Zapadni	113
23	31	North and Staraya Artil	508
24	32	East	288
25	33	Zapadni	340
26	34	North and Staraya Artil	567
27	35	East	211
28	36	Zapadni	70
29	37	North and Staraya Artil	854
30	38	East	102
		Total	11,472

AGE CLASSES

The age class of a male seal of the Pribilof Islands herd is determined from the length of its body. The classification was derived from measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

Age classes of male seals, Pribilof Islands

Age	Length (inches)	Age	Length (inches)
Yearlings	Up to 36.75.	4-year-olds	46 to 51.75.
2-year-olds	37 to 40.75.	5-year-olds	52 to 57.75.
3-year-olds	41 to 45.75.	6-year-olds	58 to 63.75.

Ages of seals killed on Pribilof Islands, calendar year 1935

[On basis of classification shown in preceding table]

Age	St. Paul Island	St. George Island	Total
2 year-old males	880	94	974
3-year-old males	43,657	11,233	54,890
4-year-old males	1,070	127	1,197
Cows [1]	217	18	235
Total	45,824	11,472	57,296

[1] Cows unavoidably and accidentally killed or found dead.

Some of the seals recorded in the above tabulation as 2-year-olds and 4-year-olds probably were 3-year-olds, as not all male seals of a given age fall within the length limits assigned for the males of that age. As far as possible, the killings in 1935 were confined to 3-year-old males.

RESERVING OPERATIONS

No 3-year-old male seals were marked for the breeding reserve in 1935. It was evident at the close of the season that the number of adolescent males of this age class was ample to maintain in subsequent years the supply of bulls in sufficient strength to meet all breeding requirements of the herd.

COMPUTATION OF FUR-SEAL HERD

The computation of the fur-seal herd in 1935 was made by Supt. H. J. Christoffers. As of August 10 the total of all classes was 1,550,913—a numerical increase of 120,495 over the figures for the preceding year. The detailed report will be found on pages 65 to 71 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1924 to 1935, inclusive:

General comparison of computations of the seal herd on the Pribilof Islands, 1924 to 1935

Classes	1924	1925	1926	1927	1928	1929
Harem bulls	3, 516	3, 526	4, 034	4, 643	6, 050	7, 187
Breeding cows	208, 396	226, 090	244, 114	263, 566	284, 725	307, 491
Surplus bulls	2, 043	3, 558	2, 002	4, 827	5, 285	5, 207
Idle bulls	390	311	423	972	1, 449	1, 633
6-year-old males	8, 489	4, 105	13, 434	13, 450	12, 857	10, 399
5-year-old males	5, 132	16, 792	16, 812	16, 073	13, 001	7, 016
4-year-old males	18, 670	18, 692	17, 872	14, 448	7, 798	9, 102
3-year-old males	21, 551	21, 185	17, 189	9, 730	11, 133	13, 639
2-year-old males	45, 685	43, 515	38, 183	41, 252	49, 087	64, 354
Yearling males	59, 291	52, 091	56, 514	61, 026	65, 861	85, 381
2-year-old cows	51, 359	49, 786	44, 415	48, 186	57, 061	67, 210
Yearling cows	64, 240	57, 309	62, 175	67, 131	72, 481	85, 417
Pups	208, 396	226, 090	244, 114	263, 566	284, 725	307, 491
Total	697, 158	723, 050	761, 281	808. 870	871, 513	971, 527

Classes	1930	1931	1932	1933	1934	1935
Harem bulls	8, 312	9, 233	10, 088	10, 213	10, 770	11, 547
Breeding cows	332, 084	358, 642	387, 320	418, 299	451, 751	487, 883
Surplus bulls	3, 963	3, 291	2, 893	4, 700	6, 494	6, 139
Idle bulls	1, 899	1, 888	2, 349	2, 341	2, 282	2, 535
6-year-old males	5, 612	6, 553	8, 154	9, 335	8, 173	11, 117
5-year-old males	8, 191	10, 193	11, 669	10, 216	13, 897	14, 276
4-year-old males	11, 327	12, 966	11, 351	15, 441	15, 862	21, 096
3-year-old males	14, 871	13, 198	17, 849	18, 216	24, 770	28, 165
2-year-old males	69, 674	74, 828	81, 101	87, 662	94, 920	102, 555
Yearling males	92, 232	99, 612	107, 592	116, 195	125, 490	135, 525
2-year-old cows	72, 605	78, 410	84, 682	91, 454	98, 768	106, 666
Yearling cows	92, 247	99, 626	107, 593	116, 197	125, 490	135, 526
Pups	332, 084	358, 642	387, 320	418, 299	451, 751	487, 883
Total	1, 045, 101	1, 127, 082	1, 219, 961	1, 318, 568	1, 430, 418	1, 550, 913

CORRECTION IN REPORT OF KILLINGS FOR 1934

When the unpacking of the fur-seal skins shipped from the Pribilof Islands in 1934 was completed, it was found that the consignment to the Department's selling agents at St. Louis and that to the Dominion of Canada each contained one skin in excess of the number shown on the shipping lists, thus indicating that the number of skins actually taken on the islands in that year was 53,470, instead of 53,468 as originally reported. The discrepancy appears to have been the result of a mistake in the count from one of the kenches, when skins were being barreled on St. George Island, and a corresponding adjustment in a subsequent killing record.

The records are being corrected, therefore, to show a total of 53,470 sealskins taken on the Pribilof Islands in 1934, of which 42,972 were from St. Paul Island and 10,498 from St. George Island. The revised records also show there were allotted to the Dominion of Canada under the provisions of the fur-seal treaty 8,023 skins, consisting of 8,021 as its share of the season's take and 2 additional skins to correct a shortage in the 1933 consignment.

FOXES

Herds of blue foxes on St. Paul and St. George Islands yield several hundred pelts annually. The care of these herds fits in well with the fur-seal industry, as it requires attention at a time when sealing activities are at a minimum. Throughout the winter when the natural supply of food on the islands is scarce the foxes are fed prepared rations and salted seal meat. During December and January the animals are trapped for their pelts and for marking and releasing for the breeding reserve.

TRAPPING SEASON OF 1935–36

In the 1935–36 season 1,034 fox skins were taken, of which 1,019 were blue and 15 white. Two hundred and twenty blue and 9 white skins were taken on St. Paul Island and 799 blue and 6 white skins on St. George Island.

After the close of the killing season the foxes did not enter the traps readily because the winter was mild and an ample supply of food could be obtained from the beaches. Six foxes on St. Paul Island and 116 on St. George Island were trapped, marked, and released for future breeding stock. The reserve also includes a considerable number of animals that were not captured during the season.

REINDEER

St. Paul Island.—During the year ended September 30, 1935, 23 reindeer on St. Paul Island were killed and used for food. A count of the animals in the herd on September 26 showed a total of 1,162, of which it was estimated that 350 were the young of the season. The herd appeared to be in excellent condition.

St. George Island.—Three reindeer were killed and used for food on St. George Island during the year ended September 30, 1935. A count made on September 30 showed 71 animals in the herd, of which 9 were the young of the season.

FUR-SEAL SKINS

SHIPMENTS

Seven hundred and thirteen barrels containing 57,271 fur-seal skins taken on the Pribilof Islands in 1935 were shipped on the U. S. S. *Sirius* and arrived at Seattle on August 23. Delivery of 8,594 skins, packed in 107 barrels, was made to a representative of the Canadian Government at Seattle on August 24, in accordance with provisions of the fur-seal treaty. The remaining 48,677 skins were forwarded by freight to the Fouke Fur Co. at St. Louis, Mo., and arrived there on August 31.

Twenty-five sealskins taken in 1935, specially cured by being stretched and dried, were brought to Seattle on the *Penguin* in August and were turned over to a representative of the Fouke Fur Co. for transporting to St. Louis.

SALES

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis in 1935—on April 8 and September 16, respectively—at which a total of 50,832 skins were sold. During the year, also, 2,590 sealskins taken on the Pribilof Islands were disposed of at private sales, under special authorization of the Secretary of Commerce. In the following detailed statements the sales of other sealskins by the Department of Commerce for the account of the Government are included, in order that the records may be complete.

April 8, 1935.—Twenty-six thousand four hundred and three Pribilof Islands fur-seal skins, dressed, dyed, and machined, were sold on April 8 for $616,990.75. These skins consisted of 12,600 dyed black, 11,500 dyed Safari brown, and 2,303 dyed logwood brown.

September 16, 1935.—At the sale on September 16, 24,429 Pribilof Islands fur-seal skins were sold for $569,708.10. Of these, 24,350 dressed, dyed, and machined, brought $569,540, and 79 miscellaneous raw-salted, unhaired, and unhaired and dressed skins brought $168.10. In addition, 125 dressed, dyed, and machined and 75 raw-salted fur-seal skins taken by the Japanese Government on Robben Island in 1934 and allotted to the United States as its share of such skins under provisions of the fur-seal treaty were sold for $2,762.25. There were also sold 14 confiscated fur-seal skins, parchments, for $69, making a total of $572,539.35 for fur-seal skins at this sale.

Special sales.—During the year, 2,590 Pribilof Islands fur-seal skins were sold under special authorization by the Department for advertising and promotional purposes, the gross sales amounting to $59,360. Included in the foregoing were 14 skins (7 black and 7 logwood brown) that had been made up into two coats for exhibition. The coats were advertised by the Division of Purchases and Sales and were sold to the highest bidders, the black coat bringing $421.22, and the brown, $200. Of the other skins sold, 1,578 dyed Safari brown brought $39,434.53; 960 dyed black, $18,484.67; 26 dyed logwood brown, $488.02; and 12 skins specially prepared for exhibition purposes, $331.56.

Further details in regard to the sales of sealskins by the Department of Commerce for the account of the Government in 1935 are given in the following tables:

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1935

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total amount	Percentage
DYED BLACK										
Extra extra large:										
Apr. 8	III	4	$14.00	$14.00	$14.00	$56.00	4	$14.00	$56.00	0.03
Sept. 16	I and II	4	30.00	30.00	30.00	120.00	20	26.00	520.00	.17
	Scarred, faulty, etc	16	25.00	25.00	25.00	400.00				
Extra large:										
Apr. 8	I and II	220	33.00	29.50	31.23	6,870.00	640	25.59	16,380.00	5.08
	Scarred, faulty, etc	360	24.50	23.00	24.08	8,670.00				
	III	60	14.00	14.00	14.00	840.00				
Sept. 16	I and II	213	32.50	28.00	30.19	6,430.00	532	25.27	13,445.00	4.48
	Scarred, faulty, etc	229	26.00	24.00	25.13	5,755.00				
	III	90	14.00	14.00	14.00	1,260.00				
Large:										
Apr. 8	I and II	1,510	30.50	26.00	27.67	41,785.00	3,880	24.61	95,480.0	30.79
	Scarred, faulty, etc	2,170	25.50	21.50	23.66	51,345.00				
	III	200	12.50	11.00	11.75	2,350.00				
Sept 16	I and II	2,117	30.00	23.50	24.98	52,885.00	4,031	23.31	93,962.00	33.96
	Scarred, faulty, etc	1,721	23.50	20.50	22.33	38,425.00				
	III	193	14.00	13.50	13.74	2,652.00				
Medium:										
Apr. 8	I and II	2,780	24.00	21.50	22.65	62,970.00	6,980	19.38	135,250.00	55.40
	Scarred, faulty, etc	3,920	19.75	16.00	17.69	69,340.00				
	III	280	11.00	10.00	10.50	2,940.00				
Sept. 16	I and II	3,157	23.50	20.75	22.34	70,532.75	6,135	20.55	126,091.75	51.69
	Scarred, faulty, etc	2,836	19.50	18.50	19.08	54,102.00				
	III	142	11.00	8.50	10.26	1,457.00				
Small medium:										
Apr. 8	I and II	530	16.50	15.00	15.71	8,325.00	1,096	14.73	16,149.00	8.70
	Scarred, faulty, etc	510	14.50	14.00	14.35	7,320.00				
	III	56	9.00	9.00	9.00	504.00				
Sept. 16	I and II	458	20.75	17.75	18.24	8,356.00	1,151	16.88	19,430.50	9.70
	Scarred, faulty, etc	642	16.75	16.25	16.57	10,641.00				
	III	51	8.50	8.50	8.50	433.50				
All classes:										
Apr. 8							12,600	20.90	263,315.00	100.00
Sept. 16							11,869	21.35	253,449.25	100.00

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1935—Continued

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total amount	Percentage
DYED SAFARI BROWN										
Extra extra large:										
Apr. 8	Scarred, faulty, etc	12	$27.00	$27.00	$27.00	$324.00	12	$27.00	$324.00	0.10
Extra large:										
Apr. 8	I and II	402	37.00	33.50	35.36	14,214.00	656	31.74	20,819.00	5.70
	Scarred, faulty, etc	239	28.75	25.50	26.95	6,440.00				
	III	15	11.00	11.00	11 00	165.00				
Sept. 16	I and II	509	33.50	30.50	31.22	15,891.50	809	29.92	24,201.50	6.84
	Scarred, faulty, etc	300	28.50	26.00	27.70	8,310.00				
Large:										
Apr. 8	I and II	2,708	37.00	26.00	31.70	85,835.50	4,878	28.60	139,490.50	42.42
	Scarred, faulty, etc	2,100	27.00	24.00	25.18	52,885.00				
	III	70	11.00	11.00	11.00	770.00				
Sept. 16	I and II	2,773	30.00	25.75	27.63	76,629.50	4,650	26.61	123,730.50	39.30
	Scarred, faulty, etc	1,830	27.75	12.50	25.43	46,537.00				
	III	47	12.00	12.00	12.00	564.00				
Medium:										
Apr. 8	I and II	3,122	29.50	24.00	26.97	84,207.00	5,322	25.08	133,483.25	46.28
	Scarred, faulty, etc	2,075	25.75	20.50	23.08	47,901.25				
	III	125	11.00	11.00	11.00	1,375.00				
Sept. 16	I and II	3,051	29.00	24.50	26.21	79,974.50	5,850	24.50	143,305.75	49.45
	Scarred, faulty, etc	2,726	25.00	11.00	22.95	62,555.25				
	III	73	12.00	10.00	10.63	776.00				
Small medium:										
Apr. 8	I and II	350	22.75	21.75	22.24	7,785.00	632	19.98	12,625.00	5.50
	Scarred, faulty, etc	262	18.00	17.25	17.63	4,620.00				
	III	20	11.00	11.00	11.00	220.00				
Sept. 16	I and II	275	23.50	22.50	22.85	6,285.00	522	20.94	10,931.50	4.41
	Scarred, faulty, etc	229	20.50	11.00	19.50	4,466.50				
	III	18	10.00	10.00	10.00	180.00				
All classes:										
Apr. 8							11,500	26.67	306,741.75	100.00
Sept. 16							11,831	25.54	302,169.25	100.00
DYED LOGWOOD BROWN										
Extra extra large:										
Apr. 8	I and II	2	25.00	25.00	25.00	50.00	6	24.33	146.00	.26
	Scarred, faulty, etc	4	24.00	24.00	24.00	96.00				
Sept. 16	Scarred, faulty, etc	5	24.50	24.50	24.50	122.50	5	24.50	122.50	.77

Extra large:										
Apr. 8	I and II	79	26.50	25.00	25.81	2,039.00	128	24.27	3,106.50	5.56
	Scarred, faulty, etc	43	24.50	22.00	23.64	1,016.50				
	III	6	8.50	8.50	8.50	51.00				
Sept. 16	I and II	12	25.00	25.00	25.00	300.00	30	24.70	741.00	4.61
	Scarred, faulty, etc	18	24.50	24.50	24.50	441.00				
Large:										
Apr. 8	I and II	298	26.00	24.50	25.38	7,564.50	749	23.19	17,370.00	32.52
	Scarred, faulty, etc	436	24.50	21.00	22.20	9,678.00				
	III	15	8.50	8.50	8.50	127.50				
Sept. 16	I and II	75	25.00	24.50	24.73	1,855.00	202	24.41	4,931.50	31.08
	Scarred, faulty, etc	127	24.50	23.50	24.22	3,076.50				
Medium:										
Apr. 8	I and II	380	23.00	21.00	21.71	8,248.75	1,180	19.18	22,633.25	51.24
	Scarred, faulty, etc	764	19.00	17.00	18.43	14,078.50				
	III	36	8.50	8.50	8.50	306.00				
Sept. 16	I and II	113	23.50	19.50	22.46	2,538.50	393	19.69	7,738.50	60.46
	Scarred, faulty, etc	280	19.50	17.50	18.57	5,200.00				
Small medium:										
Apr. 8	I and II	54	21.75	18.00	18.87	1,019.25	240	15.33	3,678.25	10.42
	Scarred faulty, etc	173	18.00	14.25	14.73	2,548.50				
	III	13	8.50	8.50	8.50	110.50				
Sept. 16	I and II	16	19.50	19.50	19.50	312.00	20	19.40	388.00	3.08
	Scarred, faulty, etc	4	19.00	19.00	19.00	76.00				
All classes:										
Apr. 8							2,303	20.38	46,934.00	100.00
Sept. 16							650	21.42	13,921.50	100.00
MISCELLANEOUS										
Sept. 16	Unhaired and dressed	26	2.00	.50	1.88	49.00	79	2.13	168.10	100.00
	Unhaired	10	.30	.30	.30	3.00				
	Washed and dried	43	2.70	2.70	2.70	116.10				

Special sales of Pribilof Islands fur-seal skins in 1935

Date	Number of skins	Description	Price per skin	Total
Jan. 30	42	Dyed Safari brown, medium	$23.40	$982.80
Feb. 28	39	Dyed Safari brown, large	28.53	1,112.67
	93	Dyed Safari brown, medium	23.40	2,176.20
	35	Dyed Safari brown, small medium	17.47	611.45
	30	Dyed Safari brown, large, scarred and faulty	21.68	650.40
	80	Dyed Safari brown, medium, scarred and faulty	17.57	1,405.60
	15	Dyed Safari brown, small medium, scarred and faulty	11.55	173.25
	93	Dyed black, large	21.10	1,962.30
	83	Dyed black, medium	16.35	1,357.05
	38	Dyed black, small medium	12.37	470.06
	72	Dyed black, large, scarred and faulty	16.35	1,177.20
	90	Dyed black, medium, scarred and faulty	13.39	1,205.10
	24	Dyed black, small medium, scarred and faulty	11.42	274.08
	7	Dyed black [1]		421.22
	7	Dyed logwood brown [1]		200.00
Mar. 31	26	Dyed logwood brown, medium	18.77	488.02
	50	Dyed black, medium	16.35	817.50
	1	Dyed Safari brown, large	28.53	28.53
	76	Dyed Safari brown, medium	23.40	1,778.40
Apr. 7	18	Dyed black, medium	16.35	294.30
	7	Dyed Safari brown, medium	23.40	163.80
Apr. 18	2	Dyed black, medium	22.65	45.30
May 30	22	Dyed black, large	27.67	608.74
	18	Dyed black, medium	22.65	407.70
	84	Dyed Safari brown, large	31.70	2,662.80
	143	Dyed Safari brown, medium	26.97	3,856.71
	60	Dyed Safari brown, medium, scarred and faulty	23.08	1,384.80
June 28	6	Dyed black, large	27.67	166.02
	89	Dyed black, medium	22.65	2,015.85
	3	Dyed Safari brown, large	31.70	95.10
	136	Dyed Safari brown, medium	26.97	3,667.92
	50	Dyed Safari brown, medium, scarred and faulty	23.08	1,154.00
July 30	9	Dyed Safari brown, medium	26.97	242.73
	12	Dyed Safari brown, large	31.70	380.40
	56	Dyed black, medium	22.65	1,268.40
	1	Dyed black, large	27.67	27.67
	21	Dyed black, medium, scarred and faulty	17.69	371.49
Aug. 30	121	Dyed Safari brown, medium	26.97	3,263.37
	2	Dyed Safari brown, large	31.70	63.40
	80	Dyed Safari brown, medium, scarred and faulty	23.08	1,846.40
	29	Dyed black, medium, scarred and faulty	17.69	513.01
	3	Dyed black, medium	22.65	67.95
Nov. 30	70	Dyed Safari brown, large	27.63	1,934.10
	160	Dyed Safari brown, medium	26.21	4,193.60
	80	Dyed Safari brown, medium, scarred and faulty	22.95	1,836.00
	12	Exhibition skins	27.63	331.56
	80	Dyed black, medium	22.34	1,787.20
Dec. 30	70	Dyed Safari brown, large	27.63	1,934.10
	80	Dyed Safari brown, medium, scarred and faulty	22.95	1,836.00
	35	Dyed black, large	24.98	874.30
	35	Dyed black, large, scarred and faulty	22.33	781.55
	55	Dyed black, medium	22.34	1,228.70
	40	Dyed black, medium, scarred and faulty	19.08	763.20
	2,590			59,360.00

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[1] Skins had been made into coat for display purposes. The coat was advertised and sold to the highest bidder.

Sale at St. Louis, Mo., Sept. 16, 1935, of 200 fur-seal skins received from Japanese Government under treaty provisions

Number of skins	Trade classification	Price per skin	Total
31	Dressed, dyed, and machined, Safari brown	$24.00	$744.00
43	Do	23.25	999.75
51	Dressed, dyed, and machined, Safari brown; scarred and faulty	18.50	943.50
75	Raw salted	1.00	75.00
200			2,762.25

DISPOSITION OF FUR-SEAL SKINS TAKEN ON PRIBILOF ISLANDS

On January 1, 1935, there were on hand 68,114 fur-seal skins taken on the Pribilof Islands. Of these, 68,082 were at St. Louis, Mo., and 32 at Washington. The foregoing figures include one skin in excess of the number shown at the close of 1934, an extra skin having been found when the season's shipment was unpacked at St. Louis.

In 1935, 57,296 fur-seal skins were taken on the Pribilof Islands, of which 8,594 were allotted to the Government of the Dominion of Canada as its share of the season's take.

Of the skins on hand at the beginning of the year, 53,422 were disposed of, leaving 14,692 unsold, which with the 48,702 from the 1935 take make a total of 63,394 on hand on December 31, 1935. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government fur-seal skins under the control of the Department of Commerce.

Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1935

Source	On hand Jan. 1	Receipts in 1935	Sales in in 1935	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1933	22, 835		22, 510	325
Calendar year 1934	[1] 45, 247		30, 898	14, 349
Calendar year 1935		48, 702		48, 702
United States' share of Japanese fur-seal skins: Season of 1934	200		200	
Confiscated fur-seal skins		15	14	1
Total	68, 282	48, 717	53, 622	63, 377

[1] Includes 1 extra skin found when shipment was unpacked at St. Louis.

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1935

Source	On hand Jan. 1			Receipts in 1935	Disposed of in 1935		On hand Dec. 31		
	Fouke Fur Co.	Washington office	Total		Sales	Delivered to Canada	Fouke Fur Co.	Washington office	Total
Taken on Pribilof Islands:									
Calendar year 1918, held for reference purposes		7	7					7	7
Calendar year 1923		3	3					3	3
Calendar year 1924		1	1					1	1
Calendar year 1929		5	5					5	5
Calendar year 1930		2	2					2	2
Calendar year 1931		[1] 14	14		14				
Calendar year 1933	22, 835		22, 835		22, 510		325		325
Calendar year 1934	[2] 45, 247		45, 247		30, 898		14, 349		14, 349
Calendar year 1935				57, 296		8, 594	48, 702		48, 702
Miscellaneous skins held for reference purposes		4	4					4	4
United States share of Japanese sealskins: Season of 1934	200		200		200				
Confiscated skins				15	14		1		1
Total	68, 282	36	68, 318	57, 311	53, 636	8, 594	63, 377	22	63, 399

[1] Skins made up into coats for display purposes.
[2] Includes 1 extra skin found when shipment was unpacked at St. Louis.

SHIPMENT AND SALE OF FOX SKINS

The 184 blue and 16 white fox skins taken on St. Paul Island and the 799 blue and 3 white fox skins taken on St. George Island in the season of 1934–35 were shipped from the islands on the *Penguin*, sailing on May 18. The vessel reached Seattle on May 28, and the fox skins were forwarded by express to the Department's selling agents at St. Louis, Mo.

At the public auction sale in St. Louis on April 8, 1935, 457 blue fox skins of the 1933–34 season's take were sold for $12,590.50, an average of $27.55 per skin. The maximum price was $66, obtained on each of a lot of four no. 1 silvery pelts. One dressed blue fox skin and one dressed white fox skin of the 1932–33 season's take that had been used for exhibition purposes were sold for $38 and $24, respectively.

On September 16, 1935, there were sold at public auction at St. Louis 491 blue and 19 white fox skins taken on the Pribilof Islands in the 1934–35 season. The blue pelts brought $10,136.50, an average of $20.64 each; and the white pelts brought $16 each, a total of $304. The maximum price was $54 a piece on two no. 1 silvery pelts.

SEA-OTTER SKINS

Eight sea-otter skins were confiscated by the Bureau in 1935. Of these, one was sold at public auction on April 8 for $300, and three were sold on September 16 for $40, $50, and $105, respectively, bringing the gross amount to $495 for the four skins. The remaining four skins, which included one pup skin, were unsold at the close of the year.

Three of the above-mentioned unsold skins were held as evidence in the trial at Valdez in October of certain residents of the Kodiak Island region charged with illegal killing of sea otters. The defendants in the case confessed that they had gone on an expedition in the gas boat *Emma S* in September 1934 to hunt sea otters with rifles and had killed 18 of the animals. One of the defendants, Charles L. E. Svendsen, owner of the boat, was fined $200 and sentenced to 6 months in jail; three others—Daniel Taylor, Mike Gregoroff, and Constantine Chernikoff—were sentenced to 2 months in jail, in addition to the 7 months spent there awaiting trial. Warden Charles P. Turner, of the Kodiak district, handled this matter in behalf of the Bureau.

The killing of sea otters in the waters of the North Pacific Ocean is prohibited by the international treaty of July 7, 1911, and by the law and regulations giving effect thereto. All sea-otter skins illegally taken and brought into territory of the United States are subject to seizure and forfeiture to the Government.

FUR-SEAL PATROL

UNITED STATES COAST GUARD

The Treasury Department, as in past years, assigned a number of Coast Guard cutters and patrol boats to maintain a patrol for the protection of the fur-seal herd, both during the northward migration and during the period when the herd is at the Pribilof Islands. Five cutters, three 165-foot patrol boats, and two 125-foot patrol boats were detailed for this work.

The patrol boat *Colfax* operated off the coast of Oregon and Washington from March 5 to March 23. The *Onondaga*, beginning April 5, patrolled from the mouth of Columbia River to Dixon Entrance until the herd had passed. The *Tallapoosa* took up the patrol at Dixon Entrance on April 15 and operated as far west as Kodiak Island until April 30. From May 1 to 15 the *Tallapoosa* patrolled in the area from Kodiak Island to Unimak Pass.

The *Tahoe*, accompanied by the patrol boats *Aurora* and *Calypso*, sailed from San Francisco on April 10 for Unalaska, and was joined in Alaska by the patrol boat *Alert*. The *Aurora* and *Calypso*, operating from the Unalaska base, patrolled the waters of Bering Sea until July 15, when they were relieved by the patrol boats *Daphne* and *Atalanta*, which continued on patrol until the close of the season on October 1. The *Chelan* also was based at Unalaska during the greater part of the season.

The *Northland* left San Francisco on May 5 on its annual cruise to the Arctic Ocean and patrolled in Bering Sea and adjacent waters while en route.

BUREAU OF FISHERIES

Two vessels of the Bureau of Fisheries were assigned to patrol the waters off the northwest coast of the State of Washington and in the vicinity of Sitka, Alaska, where sealing operations by native Indians are concentrated. The *Brant*, with base at Neah Bay, patrolled in the vicinity of Cape Flattery from April 9 until May 11. The *Scoter* maintained a patrol in the vicinity of Sitka from April 20 to May 27.

A representative of the Bureau of Fisheries was again on duty at La Push, Wash., to secure compliance with the treaty provisions which prohibit the use of firearms or motorboats in the taking of fur seals by aborigines. The stomachs of fur seals killed by the Indians of La Push and Sitka were collected and preserved to provide information as to their food when in these waters.

SEALING PRIVILEGES ACCORDED ABORIGINES

In accordance with the privilege granted them by article IV of the North Pacific Sealing Convention of July 7, 1911, Indians dwelling on the coasts of Washington, Alaska, and British Columbia carried on pelagic sealing by primitive methods. During the 1935 season there were taken and duly authenticated by officials of the respective Governments 975 fur-seal skins, of which 134 were taken by Indians under the jurisdiction of the United States and 841 by Indians of Canada. The details are as follows:

Washington.—Seventy-five sealskins taken by Indians of Washington were authenticated. Of these, 9 were from male seals and 66 from females. The skins were taken by Indians of La Push and Neah Bay in the months from January to May, inclusive, and were authenticated by A. M. Rafn, special agent of the Bureau, and by N. O. Nicholson, superintendent of the Taholah Indian Agency, Hoquiam, Wash.

Alaska.—Fifty-nine sealskins taken by natives of Sitka were authenticated by Warden Donald S. Haley. Of these skins, 26 were from male seals and 33 from females. The seals were taken in the waters off Biorka Island in the month of May.

British Columbia.—Indians along the British Columbia coast took 841 fur-seal skins in 1935.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

Under the provisions of the fur-seal treaty of 1911, there were allotted to the United States 201 Japanese fur-seal skins, or 10 percent of the number taken by Japan on Robben Island in 1935. These skins were received by the Department's selling agents at St. Louis, Mo., on January 2, 1936.

FOOD OF FUR SEALS

There have been numerous complaints in recent years from commercial fishermen, chiefly along the British Columbia coast, that the rapidly growing fur-seal herd on its annual northward migration is proving a serious menace to valuable salmon and halibut fisheries in North Pacific waters. Investigation of the food habits of fur seals in 1896 and 1897 indicated that neither salmon nor halibut were important in the diet of fur seals, but that they were eaten when available. These studies indicated that a species of squid, particularly abundant in the North Pacific, constituted the principal food of the seal. Similar studies in 1931 of seals killed off the British Columbia coast showed herring to be by far the most important item of food for fur seals in those waters.

In order to obtain additional information on this subject, 54 seal stomachs were obtained from animals killed by Indians off the Washington coast and 59 from animals similarly killed in the vicinity of Sitka, Alaska. The analysis of the stomach contents, made by Franklin H. May of the Bureau of Biological Survey, shows that herring comprised the bulk of the food of fur seals in these waters during their northward migration. Remains of crustacea and squid were present in relatively small quantities. There was no evidence that salmon or halibut had been eaten.

Independently of this study, Canadian authorities examined 593 fur-seal stomachs from animals killed by Indians off the British Columbia coast during the spring of 1935. Fur seals in these waters also were found to have fed chiefly upon herring, that species being found in 91 percent of the stomachs containing food. Salmon were found in about 7 percent of the stomachs containing food, and halibut was not among any of the food items. Crustacea formed an important part of the diet, as did eulachon and squid.

These studies indicate that there has been no change in the diet of fur seals in recent years. The findings of the early investigators that seals feed near the surface, consuming the form of animal life most available, is well substantiated. It is apparent, therefore, that our valuable commercial fisheries are not endangered by the continued growth of the fur-seal herd at the Pribilof Islands.

FUR SEALS FOR EXHIBITION

Five live fur seals—three 2-year-old females, one 4-year-old male, and one 5-year-old male—were shipped from the Pribilof Islands on the U. S. S. *Sirius* in August 1935 for the San Diego Zoological Garden. The seals were forwarded from Seattle by express and reached San Diego on August 27 in excellent condition. While on the vessel they were fed frozen herring, but no food was supplied for the trip from Seattle to San Diego. Ice in gunny sacks on top of the crates kept the animals cool on the journey by train. At the zoo the seals were placed in specially constructed pools, with plenty of shade, and at the close of the year all seemed to be thriving.

Several shipments of fur seals from the Pribilof Islands have been forwarded previously from time to time—the most recent being those in 1928 to the Steinhart Aquarium, Golden Gate Park, San Francisco, and to the National Zoological Park, Washington, D. C., and in 1932 to the latter place. The average life of the animals, however, has been comparatively short, and none of the seals that were formerly shipped now survives. The seals at San Diego, therefore, are the only living specimens of Alaska fur seal in captivity.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1935

By Harry J. Christoffers

The number of seals available for commercial killing at the Pribilof Islands showed a satisfactory increase in the season of 1935. There were 54,890 classed as 3-year-old males killed, as compared with 51,935 in 1934. The number of 3-year-olds in drives continued to increase until July 7, after which there was a gradual reduction. At first it was thought that it would be advisable to discontinue killing about July 25, but as the season advanced it was apparent that sufficient 3-year-old males were arriving to permit continuing the killing season until the last of the month without detriment to the herd.

The large number of 3-year-old males in drives during the last few days of July showed plainly that an ample reserve of this age class remained for breeding requirements. Further evidence of this was seen in the numbers which continued to arrive after commercial killing ceased. There were also plenty of mature young bulls on hand to answer requirements of the 2-year-old females arriving in early August. These bulls appeared to be in excellent condition.

In order to ascertain whether sufficient males have been reserved for breeding requirements it is necessary to make a count, or as close an estimate as possible, of the number of bulls and cows arriving at the islands each season. Previously used methods of estimating the number of cows and counting as closely as possible the number of breeding males were continued this season.

Breeding areas on the various rookeries continued to expand. Where the hauling grounds are within the rookery areas the bachelors now have a hard time working through the harems on account of the numerous breeding bulls. This is particularly true of Reef and Gorbatch rookeries on St. Paul Island and of North rookery on St. George Island. For this reason drives from these rookeries are decreasing in size and drives from rookeries where hauling grounds are adjacent to breeding areas are increasing in size. It soon will be impossible during the height of the season for bachelors to haul out at all on the present Reef and Gorbatch hauling grounds. Presumably they will eventually haul out on Zoltoi sands, adjacent to Gorbatch rookery. In early sealing days all drives were made from Zoltoi. When Zoltoi again becomes the hauling ground for Reef and Gorbatch it will be a great benefit to the nonkillable seals, as at present the drive from these rookeries is the longest and hardest on either island.

BULLS

Each year, as the seal herd increases in size, it becomes more difficult to make accurate counts of bulls on the larger rookery areas. By making actual counts on the smaller congested areas of the larger rookeries, however, it is possible to form a very close estimate of the number of bulls on the entire rookery. The counts and estimates thus made are sufficiently accurate for all practical requirements.

Owing to the impossibility of making accurate counts of the larger rookeries, the entire harem and idle bull census should be considered only as a close estimate.

The reserving of sufficient 3-year-old males for breeding requirements is very necessary to provide for a maximum growth of the herd. It is essential, therefore, to continue to take a census or to estimate the number of breeding bulls on hand each year. This is the only way to determine the approximate average harem, which must be maintained at a proper size if the herd is to increase at the maximum rate.

There also must be sufficient mature young bulls to take care of the virgin 2-year-old females. Accurate observations alone can determine whether there are sufficient bulls of this class. It is to the best interests of the herd to reserve a few more males than actually are required for breeding purposes.

Polovina and Polovina Cliffs now form one continuous rookery. Harems now cover that part of the available waterfront which up to this year separated the two rookeries.

On the North and East Cliffs rookeries, St. George Island, harems cover the entire area between the waterfront and the high cliffs. There are therefore no idle bulls in the rear of these rookeries. The idle bulls are found only on the adjacent hauling grounds.

A pure albino 5-year-old male seal was observed on Reef hauling grounds throughout the latter part of the season. Its presence was not noted in the previous years of its existence. The animal was not killed, as it was thought advisable to leave it for further observation, should it live long enough to hold a harem. It appeared to have difficulty in seeing and therefore had a hard time keeping up with the other animals when disturbed or in drives.

Estimated number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1935

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi	July 19	407	82	489	1:5	39.65
Lukanin	do	189	26	215	1:7	41.28
Gorbatch	July 20	893	169	1,062	1:5	45.89
Ardiguen	do	88	15	103	1:6	44.04
Reef	do	1,671	416	2,087	1:4	49.26
Sivutch	do	426	87	513	1:5	59.13
Lagoon	July 19	3		3		38.33
Tolstoi	do	1,059	243	1,302	1:4	45.75
Zapadni	July 18	942	231	1,173	1:4	49.43
Little Zapadni	do	507	84	591	1:6	46.82
Zapadni Reef	do	57	24	81	1:2	14.44
Polovina	do	382	99	481	1:4	43.81
Polovina Cliffs	do	315	79	394	1:4	29.09
Little Polovina	do	107	38	145	1:3	31.19
Morjovi	July 17	317	72	389	1:4	18.92
Vostochni	do	2,081	417	2,498	1:5	32.09
Total		9,444	2,082	11,526	1:5	42.14
St. George Island:						
North	July 21	717	87	804	1:8	45.29
Staraya Artil	do	567	179	746	1:3	43.15
Zapadni	July 22	183	57	240	1:3	18.87
South	do	133	8	141	1:17	6.09
East Reef	July 21	134	39	173	1:3	55.53
East Cliffs	do	369	83	452	1:4	57.57
Total		2,103	453	2,556	1:5	42.74
Total (both islands)		11,547	2,535	14,082	1:5	42.25

AVERAGE HAREM

The only way to determine whether sufficient bulls have been reserved is to ascertain the average harem and make observations as to whether there are sufficient young bulls to take care of the late-arriving 2-year-old females. The ideal average harem is considered to be from 40 to 45 females.

The estimated average harem in 1935 for St. Paul Island was 42.14 and for St. George Island 42.74. This is an increase of 0.46 over the preceding year for St. Paul Island and a decrease of 0.41 for St. George Island. The average harem, as estimated, would indicate that sufficient males have been reserved for breeding requirements.

Computation of breeding cows, based on annual increase of 8 percent, and of average harem, in 1935

Rookery	Breeding cows		Harem bulls, 1935	Average harem		
	1934	1935		1935	1934	Increase (+) or decrease (−) in 1935 from 1934
St. Paul Island:						
Kitovi	14,944	16,139	407	39.65	38.42	+1.23
Lukanin	7,225	7,803	189	41.28	40.82	+.46
Gorbatch	37,943	40,978	893	45.89	47.85	−1.96
Ardiguen	3,589	3,876	88	44.04	40.33	+3.71
Reef	76,213	82,310	1,671	49.26	51.05	−1.79
Sivutch	23,322	25,188	426	59.13	58.30	+.83
Lagoon (actual count pups)	112	115	3	38.33	37.33	+1.00
Tolstoi	44,865	48,454	1,059	45.75	45.00	+.75
Zapadni	43,117	46,566	942	49.43	49.78	−.35
Little Zapadni	21,978	23,736	507	46.82	45.98	+.84
Zapadni Reef	762	823	57	14.44	12.29	+2.15
Polovina	15,495	16,735	382	43.81	41.65	+2.16
Polovina Cliffs	8,484	9,163	315	29.09	26.76	+2.33
Little Polovina	3,090	3,337	107	31.19	30.00	+1.19
Morjovi	5,554	5,998	317	18.92	17.97	+.95
Vostochni	61,826	66,772	2,081	32.09	31.02	+1.07
Total	368,519	397,993	9,444	42.14	41.68	+.46
St. George Island:						
North	30,068	32,473	717	45.29	43.51	+1.78
Staraya Artil	22,656	24,468	567	43.15	47.40	−4.25
Zapadni	3,197	3,453	183	18.87	18.70	+.17
South	750	810	133	6.09	6.10	−.01
East Reef	6,890	7,441	134	55.53	43.88	+11.65
East Cliffs	19,671	21,245	369	57.57	63.66	−6.09
Total	83,232	89,890	2,103	42.74	43.15	−.41
Total (both islands)	451,751	487,883	11,547	42.25	41.95	+.30

PUPS AND COWS

Since 1923 it has not been practicable to make an actual count of the number of pups on all rookeries. Pups could be counted on the smaller rookeries but, inasmuch as the larger rookeries normally show a greater yearly increase than the smaller rookeries, the results secured would be unsatisfactory and would not show the true growth of the herd. It appears advisable, therefore, to continue using the average rate of increase in the number of pups as determined from actual counts for the period from 1917 to 1922, inclusive. This average rate of increase of 8 percent will answer for all practical purposes.

The number of dead pups, also, can be estimated only, and the percentage found in 1922 has therefore been applied to each rookery.

The increase in size of rookery areas and the increase in the number of animals in a given area will cause a slight increase in the percentage of dead pups. It is desirable, therefore, to make as close a count as possible of the dead pups on each rookery in order to determine a new death rate.

Inasmuch as a female gives birth to only one pup a year, the number of cows on a given rookery is the same as the number of pups.

Distribution of pups on the Pribilof Islands, Aug. 10, 1935, and comparison with distribution in 1934

Rookery	1935				1934	1935
	Living pups	Dead pups	Total pups	Percent dead pups	Total pups	Increase
St. Paul Island:						
Kitovi	15, 902	237	16, 139	1. 47	14, 944	1, 195
Lukanin	7, 634	169	7, 803	2. 17	7, 225	578
Gorbatch	40, 626	352	40, 978	. 86	37, 943	3, 035
Ardiguen	3, 783	93	3, 876	2. 39	3, 589	287
Reef	81, 108	1, 202	82, 310	1. 46	76, 213	6, 097
Sivutch	24, 573	615	25, 188	2. 44	23, 322	1, 866
Lagoon (actual count)	115	--------	115	----------	112	3
Tolstoi	47, 780	674	48, 454	1. 39	44, 865	3, 589
Zapadni	45, 765	801	46, 566	1. 72	43, 117	3, 449
Little Zapadni	23, 143	593	23, 736	2. 50	21, 978	1, 758
Zapadni Reef	816	7	823	. 80	762	61
Polovina	16, 479	256	16, 735	1. 53	15, 495	1, 240
Polovina Cliffs	8, 993	170	9, 163	1. 85	8, 484	679
Little Polovina	3, 253	84	3, 337	2. 51	3, 090	247
Morjovi	5, 877	121	5, 998	2. 02	5, 554	444
Vostochni	65, 383	1, 389	66, 772	2. 08	61, 826	4, 946
Total	391, 230	6, 763	397, 993	1. 70	368, 519	29, 474
St. George Island:						
North	32, 018	455	32, 473	1. 40	30, 068	2, 405
Staraya Artil	23, 837	631	24, 468	2. 58	22, 656	1, 812
Zapadni	3, 414	39	3, 453	1. 12	3, 197	256
South	796	14	810	1. 72	750	60
East Reef	7, 329	112	7, 441	1. 51	6, 890	551
East Cliffs	20, 928	317	21, 245	1. 49	19, 671	1, 574
Total	88, 322	1, 568	89, 890	1. 74	83, 232	6, 658
Total (both islands)	479, 552	8, 331	487, 883	1. 71	451, 751	36, 132

MORTALITY OF SEALS AT SEA

In computing the number of seals of the various age classes, the same mortality rates were applied as for the season of 1934. Although mortality rates actually vary considerably from year to year, the present rates appear to answer all essential requirements and therefore should be used until abnormal conditions appear.

COMPLETE COMPUTATION

Following is a summary showing the number of the various classes of animals in the Pribilof Islands fur-seal herd in 1935. The methods used to compute the number of animals of each class are also shown. The total number of seals of all classes is estimated to be 1,550,913. This is an increase of 8.42 percent over the preceding year.

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1935

Class	St. Paul Island	St. George Island	Total
Pups, estimated	397, 993	89, 890	487, 883
Breeding cows, 3 years old and over, by inference	397, 993	89, 890	487, 883
Harem bulls, counted	9, 444	2, 103	11, 547
Idle bulls, counted	2, 082	453	2, 535
Yearlings, male and female, estimated:			
Females born in 1934	184, 260	41, 616	225, 876
Natural mortality, 40 percent	73, 704	16, 646	90, 350
Yearling females, Aug. 10, 1935	110, 556	24, 970	135, 526

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1935—Continued

Class	St. Paul Island	St. George Island	Total
Yearlings, male and female, estimated:—Continued.			
Males born in 1934	184, 259	41, 616	225, 875
Natural mortality, 40 percent	73, 704	16, 646	90, 350
Yearling males, Aug. 10, 1935	110, 555	24, 970	135, 525
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1934	102, 370	23, 120	125, 490
Natural mortality, 15 percent	15, 356	3, 468	18, 824
2-year-old females, Aug. 10, 1935	87, 014	19, 652	106, 666
Yearling males, Aug. 10, 1934	102, 370	23, 120	125, 490
Natural mortality, 17.5 percent	17, 915	4, 046	21, 961
2-year-old males beginning 1935	84, 455	19, 074	103, 529
2-year-old males killed in 1935	880	94	974
2-year-old males, Aug. 10, 1935	83, 575	18, 980	102, 555
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1934	77, 423	17, 497	94, 920
Natural mortality, 12.5 percent	9, 678	2, 187	11, 865
3-year-old males beginning 1935	67, 745	15, 310	83, 055
3-year-old males killed in 1935	43, 657	11, 233	54, 890
3-year-old males, Aug. 10, 1935	24, 088	4, 077	28, 165
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1934	20, 743	4, 027	24, 770
Natural mortality, 10 percent	2, 074	403	2, 477
4-year-old males beginning 1935	18, 669	3, 624	22, 293
4-year-old males killed in 1935	1, 070	127	1. 197
4-year-old males, Aug. 10, 1935	17, 599	3, 497	21, 096
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1934	12, 895	2, 967	15, 862
Natural mortality, 10 percent	1, 289	297	1, 586
5-year-old males, Aug. 10, 1935	11, 606	2, 670	14, 276
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1934	12, 059	1, 838	13, 897
Natural mortality, 20 percent	2, 412	368	2, 780
6-year-old males, Aug. 10, 1935	9, 647	1, 470	11, 117
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1934	6, 893	1, 280	8, 173
Natural mortality, 20 percent	1, 379	256	1, 635
7-year-old males, Aug. 10, 1935	5, 514	1, 024	6, 538
Surplus bulls, Aug. 10, 1934	(1)	(1)	6, 494
Natural mortality, 30 percent	----------	----------	1, 948
Remaining surplus for 1935	----------	----------	4, 546
Breeding bulls of 1934	10, 701	2, 351	13, 052
Natural mortality, 30 percent	3, 210	705	3, 915
1934 bulls remaining in 1935	7, 491	1, 646	9, 137
Breeding bulls of 1935	11, 526	2, 556	14, 082
1934 bulls remaining, deducted	7, 491	1, 646	9, 137
Increment of new bulls in 1935	4, 035	910	4, 945
7-year-old males computed for 1935	5, 514	1, 024	6, 538
Surplus bulls computed for 1935	----------	----------	4, 546
Total theoretical bull stock for 1935	----------	----------	11, 084
New increment of breeding bulls deducted	----------	----------	4, 945
Surplus bulls, Aug. 10, 1935	----------	----------	6, 139

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[1] Estimates have been worked out, insofar as possible, to show the approximate number of seals of each class which should be credited to each island. Seals do not haul out, however, in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the 2 islands. The total for both islands, however, is approximately correct.

RECAPITULATION

Class	Total	Class	Total
Pups	487,883	5-year-old males	14,276
Cows	487,883	6-year-old males	11,117
Harem bulls	11,547	Surplus bulls	6,139
Idle bulls	2,535		
Yearling females	135,526	Total, 1935	1,550,913
Yearling males	135,525	Total, 1934	1,430,418
2-year-old females	106,666		
2-year-old males	102,555	Numerical increase, 1935	120,495
3-year-old males	28,165	Percent increase, 1935	8.42
4-year-old males	21,096		

FISHERY INDUSTRIES OF THE UNITED STATES, 1935[1]

By R. H. Fiedler, *Chief, Division of Fishery Industries*

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[1] Administrative Report No. 24, Appendix II to the Report of the U. S. Commissioner of Fisheries, 1936. Approved for publication, June 3, 1936.

FOREWORD

This report constitutes a summary of the activities of the Division of Fishery Industries as well as an annual review of fishery statistics. As its name indicates, this Division of the Bureau is concerned with the activities and welfare of the commercial fishery and fishery industries, the trade in fishery products, and the fish canning and preserving industries. Its functions include the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed to solve the technical problems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in part 2 of this report, which includes all the detailed statistical information that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. In the preparation of this report, members of the Division's staff have taken part and their assistance is appreciatively acknowledged.

Part I. OPERATIONS OF THE DIVISION

COOPERATION WITH OTHER FEDERAL AGENCIES

As in previous years, various members of the Division's technological, economic, and statistical staff assisted other Federal agencies where the work or studies of such agencies required information or advice concerning the fishery industry.

The Bureau also has cooperated with various Federal agencies in obtaining statistical data on our fisheries. The Bureau has the cooperation of the Bureau of Agricultural Economics, Department of Agriculture, in the collection of statistics on the volume of cold-storage holdings of fish, and the health authorities in Washington, D. C., in obtaining the volume of fish handled at the Municipal Fish Wharf and Market in this city. In another instance the Bureau obtains figures on the volume of the quarterly production and holdings of fish oils for the Bureau of the Census.

During most of the past year, the technologists in several of our laboratories carried on a portion of the cooperative work undertaken by the Bureau of Fisheries, the Bureau of Chemistry and Soils, and the Food and Drug Administration, in connection with the development of standards for halibut-liver oil essential in the administration of the Federal Food and Drug Act, and for other purposes. This cooperative investigation will be described in detail elsewhere in this report.

COOPERATION WITH STATE AGENCIES

In the conduct of its technological investigations, the Bureau has always encouraged and fostered cooperation with the States. By working in close conjunction with the members of the research staffs of various State laboratories and institutions, we have been able to increase the productivity of our relatively small technological staff and have been able to carry out such cooperative investigations at considerably less cost. During the past year, the following cooperative investigations were conducted in the State institutions listed:

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[2] Fishery Industries of the United States, 1934. By R. H. Fiedler, Appendix II to the Report of the U. S. Commissioner of Fisheries for 1935, pp. 75–330.

A member of our technological staff was stationed in the laboratories of the State Medical College, Charleston, S. C., where members of the staff of the State Medical College have given valuable cooperation in a study of the mineral content of aquatic products. Dr. Roe E. Remington and Dr. Kenneth M. Lynch participated in these investigations.

At Massachusetts State College, Amherst, Mass., laboratory facilities were provided for our bacteriologist to study methods for handling fish. Members of the Massachusetts State College staff cooperating in these investigations were Drs. Fellers, Fuller, and Bradley.

At George Washington University, Washington, D. C., Dr. Leland W. Parr, associate professor of bacteriology in the school of medicine, assisted in the supervision of one of our cooperative investigations on sponge disinfectants.

At Cornell University, Ithaca, N. Y., Drs. H. S. Wilgus, Jr., L. C. Norris, and G. F. Heuser cooperated in making feeding tests of fish meals experimentally prepared in our technological investigations.

Dr. J. S. Carver, of Washington State College, Pullman, Wash., cooperated during the past year in carrying on tests with poultry in the feeding of salmon oils and meals experimentally prepared in our Seattle and Alaska laboratories.

The University of Washington, Seattle, Wash., placed space at the disposal of members of our Seattle technological laboratory for the conduct of certain byproducts investigations.

In addition to furnishing free space for the Bureau's laboratories in two of its buildings (discussed elsewhere in this report), the University of Maryland and the Maryland State Agricultural Experiment Station, College Park, Md., carried on in its various laboratories and departments of animal husbandry, cooperative investigations of the feeding value of fishery byproducts. The members of the staffs of these two institutions engaged in these cooperative investigations were Dr. L. B. Broughton, Dr. W. C. Supplee, L. E. Bopst, and M. H. Berry.

A cooperative study of the chemistry of fish proteins was conducted in the laboratories of Western Maryland College, Westminster, Md. Prof. Samuel B. Schofield, head of the chemistry department of this institution, assisted in the supervision of this project.

The Massachusetts Department of Agriculture cooperated with our fish cookery and home economics worker in conducting demonstrations at schools, women's clubs, and various other gatherings in the State of Massachusetts. This educational work was carried on by Miss Agnes I. Webster of our staff under the supervision of R. H. Sullivan, of the State Department.

All of the above cooperative investigations are discussed in detail elsewhere in this report.

In the conduct of its statistical research work, the Bureau also obtains unusual cooperation from various States. The surveys of the fisheries in the various States bordering on the Great Lakes, in the

Pacific Coast States, and in Maryland and Virginia, have been greatly facilitated by special cooperation obtained from the State fishery agencies in these States. With this aid, it is now only necessary for the Bureau to conduct partial surveys in these States to supplement the data available from the fishery agencies.

In addition, in nearly every other State where commercial fishing is prosecuted, some type of cooperation on its statistical work is rendered the Bureau by the State fishery or other agencies. This makes it possible for the Bureau to make statistical surveys of a greater portion of our fishery industries than otherwise would be possible.

EXHIBIT AT SAN DIEGO

A display depicting the activities of the Bureau was on exhibit during the past year at the California Pacific International Exposition, San Diego, Calif. This was developed by the Division and was part of the Department of Commerce display, housed in the Federal Building. The principal feature was a large diorama, consisting of a painted background of a mountain scene with a built-up foreground of rocks, trees, and underbrush. A pool of water containing live bass and other warm-water fishes was incorporated in the foreground. The fish were supplied by the Bureau and cared for by the California Department of Natural Resources, Bureau of Fish Culture. The painting depicted the fish cultural activities of the Bureau in propagating fish for angling and for capture in the commercial fisheries.

A series of 48 colored transparencies framed in two cross-shaped standards depicted some of the activities of the other Divisions. A booklet giving a brief description of the Bureau's work was distributed to interested persons.

ECONOMIC AND MARKETING INVESTIGATIONS

There is a recognized need of economic and marketing studies as aids to the industry in merchandizing its commodity. Such studies have been made by the Division in the past and are being continued now as far as possible with the limited funds available; however, they have not been on a scale commensurate with so important an industry, and one which is in such obvious need of these services.

In order to interest a wider group of fishery management officials in this type of work, the writer again urged the members of the National Planning Council of Commercial and Game Fish Commissioners at their meeting in Chicago, Ill., in April 1935, to enter this field of endeavor to aid in bringing about more stable conditions in the fishery industry. Also during the year the writer personally visited the directors of many schools of economics or business administration in various colleges of the country in order to enlist their aid in making economic fishery studies. Without an exception these men were willing to offer any cooperation possible. Since then several schools have begun student studies of localized fishery problems, all of which will be of value to the industry.

The industry in general has realized the need for economic information and through the Fishery Advisory Committee of the Secretary of Commerce, it has endorsed H. R. 8055, now pending in Congress. This bill, introduced by Congressman Bland, chairman of the Committee on Merchant Marine and Fisheries in the House of Representatives, provides for the conduct of economic fishery research, and for market news and extension services for the fishery industry; these services to be carried on by the Bureau of Fisheries.

MANUAL FOR ECONOMIC FISHERY SURVEYS

In order to be of aid to fishery management officials, teachers of economics and others in making economic fishery studies, a manual for the conduct of such work was prepared by the writer, assisted by F. F. Johnson, Assistant Chief of the Division, and others. This has been developed in such a manner that it can be used in whole or in part, depending upon the personnel and funds which may be available. The manual consists of schedules for obtaining primary market information, instructions for making the surveys, sample forms for use in tabulating the data, and instructions for tabulation. These were used as the basis for a survey undertaken during this year throughout the State of Florida by the Florida Works Progress Administration with the cooperation of this Bureau, and under the sponsorship of the State board of conservation. Another was undertaken in the city of Durham, N. C., by Duke University, under the supervision of Prof. A. J. Nichol. Several copies of these plans are available from the Bureau for loan to interested parties.

SURVEY OF FISH HATCHERY FOODS AND FEEDING PRACTICES

During the past year the fish cultural stations of the country were confronted with the problem of increased operating expenses because of the rising costs of packing-house products for fish food. This was brought forcibly to the attention of the State and Federal fish hatchery operators at the third meeting of the National Planning Council of Commercial and Game Fish Commissioners at Chicago in April 1935. At that time it was suggested that a survey be made of available fish foods with the view of finding suitable substitutes which might be available at a lower price. This was undertaken by the Bureau and the findings were reported at the sixty-fifth annual meeting of the American Fisheries Society at Tulsa, Okla., in September 1935, in a report by the writer and V. J. Samson, marketing agent of the Division.

In brief, the survey recorded that in 1934 fish hatchery operators used 11,455,000 pounds of fish food, valued at about $608,000. That great dependence is being placed on packing-house products was shown by the fact that three-fourths of the volume used consisted of such items as animal livers, hearts, and other animal organs which also were among the most expensive feeds used. However, while this condition obtained as regards all hatcheries, it was found that the commercial hatcheries contrasted to Government hatcheries, placed great dependence upon lower-priced fishery products for feeding purposes. These products were available at about one-third the cost of meat or dairy products used.

In the light of evidence obtained by various investigators and in the practical operation of governmental and State hatcheries, it appears that the protein content of the ration can be adequately supplied by a liberal use of fishery products especially for their stocks beyond the fry or juvenile stage of development. With this in mind, the Bureau of Fisheries is making greater use of fishery products at some of its hatcheries, especially on the Pacific coast. Here a small reduction plant has been installed at one of its hatcheries to manufacture meal from spent salmon. Also at some of the other Bureau hatcheries and at some State hatcheries, carp and other varieties of fish are utilized.

HORSE MACKEREL FISHERY OF MAINE

Increasing interest recently has been manifested in the horse mackerel fishery of Maine. It contributes a considerable share to the commercial fisheries of that State, and also the fish is much sought after by sportsmen. Also the fish is somewhat important to commerce because its liver is high in vitamins A and D. In view of this interest a report was prepared on the fishery by Walter H. Rich, the Bureau's agent at Portland, Maine. This has been published as Memorandum S–339, and has been widely distributed by civic and sportsmen's organizations in Maine.

THE OYSTER AND OYSTER INDUSTRY

At the request of the Oyster Growers and Dealers Association of North America, Inc., an association representing the industry in the country, a paper was prepared by the writer on the biology of the oyster, methods of capture and handling, its food value, and recipes for preparing it for the table. This has been published by the Bureau as Fishery Circular No. 21. It is being used by the industry in its educational campaign to increase the consumption of oysters.

COOPERATIVE MARKETING

The Seventy-third Congress approved, June 25, 1934, an act known as Public, No. 464, entitled "An act authorizing associations of producers of aquatic products." This act imposes various duties upon the Secretary of Commerce, which are in turn administered by the Bureau of Fisheries. In October 1935 the Bureau of Fisheries established a cooperative marketing unit in the Division of Fishery Industries, in charge of L. C. Salter, fishery economist, to have immediate supervision of administering this act. Since being established, a study has been conducted of the extent to which fishermen are organized and are acting through cooperative associations, as no compiled information was available regarding such activity in this country. Also, a study was made to learn to what extent States have enacted legislation pertaining to fishermen's associations, and whether the various States have encouraged the organization and operation of fishermen's cooperative organizations.

As a result of this work it was found that there are approximately 100 fishermen's organizations in the United States. Information has revealed that a large majority of fishermen's associations act in the capacity, or are similar to, labor unions and conduct protective functions such as matters pertaining to legislation, general labor conditions, and carry on negotiations with canners, processors, and other manufacturers with regard to fishermen's compensation, or in determining the prices of fishery products. For the most part, the associations are unincorporated and rather loosely organized, insofar as our information has revealed. Inadequate finances and limited leadership are evidently prevalent. There are, however, some 12 or 15 associations that are conducting cooperative marketing activities of a commercial nature and in which the products of their fishermen members are received and sold, and in which certain processing functions may be conducted prior to selling. A few of the associations make financial arrangements for the extension of credit to members in supplying of foodstuffs, marine and fishery supplies and equipment.

Research regarding State laws pertaining to fishermen's associations indicates that limited legislation of this nature has been enacted. In no case has it been found that State legislation has been enacted which specifically authorizes associations of producers of aquatic products. By contrast, 47 States have specific State statutes authorizing associations of producers of agricultural products. In the 38 States in which commercial fishing is conducted, 13 States have laws that are of a general cooperative nature, under which fishermen may organize cooperative associations. A number of instances were found where the general corporation laws of States provide for nonprofit associations, and in all probability nonprofit associations may be organized by fishermen under the general corporation laws of most States. There are certain privileges or benefits that are usually conveyed by specific cooperative acts which are not usually enjoyed by associations set up under general corporation laws. However, the lack of specific cooperative statutes should not be a deterring factor in the organization of fishermen's cooperatives provided that other conditions are favorable.

Other work pertaining to fishermen's cooperative associations has been to learn something of the nature and extent of their functions. Questionnaires and circular letters seeking information along this line have been sent to associations, State departments of conservation, fishery commissions, and other State officials. This work is being continued, and it is expected that a complete report will be made in the near future regarding the nature and extent of the functions of fishermen's cooperative marketing associations.

When the cooperative unit was established by the Bureau information was furnished State departments and the fishery industry in general, acquainting them of the Bureau's proposed activities in the field of fishery cooperative marketing work. Many comments were received from over the country, expressing the need for, and anticipating the desirable effects of, this work. Numerous requests have been received from several commercial fishing areas that the Bureau spend some time in the cooperative work among fishermen. As fishermen themselves have become acquainted with the nature of this work, they have written the Bureau, depicting the depressed conditions existing in their markets and expressing the desire that the Bureau assist them in solving their marketing problems. Requests were received, also, for information pertaining to the organization and operation of fishermen's associations. As a result of these numerous inquiries and requests, the Bureau issued Special Memorandum No. 2600, entitled "Organizing and Incorporating Fishery Cooperative Marketing Associations", by L. C. Salter. This publication contains information regarding: (1) The aims and principles of fishery cooperaative associations; (2) procedure for organizing associations; (3) operation methods and policies; and (4) legal requirements and corporate structure. The publication contains, also, suggested legal forms and corporate papers for fishermen's marketing associations. Copies are available for distribution, upon request, by the Bureau.

In addition to the above, considerable assistance has been given to fishery cooperative associations and groups of fishermen interested in forming such associations.

STATISTICAL INVESTIGATIONS

Fishery statistics are collected by the Bureau to serve two principal purposes—first, biological, and second, economic. For this reason the Bureau must plan its statistical surveys to obtain comprehensive data for furnishing a complete and reliable picture of the condition and trend of the fisheries. The collection and compilation of the great mass of data necessary, involves many problems. The fisheries are broad in scope, including over 160 varieties of aquatic products which enter into commercial production. These, many of which are migratory, are taken by a great variety of types of gear in water areas along our seacoast and in our interior lakes and streams. If the biological aspect is to be served, complete annual statistics are needed on each of these phases in every section. If the economic aspect is to be served, statistics are needed on not only the phases listed above relative to the biological aspect but also on the price structure, the processing function, and the marketing and distributing functions.

Statistics on these latter phases of the industry should be collected and published as soon as possible after the close of the business transactions in order to be of maximum value to the industry and others interested in the fisheries. However, because of limited funds and personnel, it has not been possible to collect and publish these figures as currently as desired. For the same reason it has not been possible to collect statistics on the fisheries of the entire United States on an annual basis.

BIOLOGICAL ASPECT

The biological aspect must consider two problems—the conservation and sustained supply of the resource and the prediction of future trends or yield. Since our fisheries are usually prosecuted in areas not under private ownership, the problem of the conservation of these fisheries is of national concern. It, therefore, is important that close watch be kept of the condition of the various fisheries to detect depletion so that remedial measures can be promulgated timely and wisely. For this reason it is imperative that current statistical data be obtained on the yield of our fisheries.

These statistics then furnish the biologist with the background upon which to base his prediction of future trends and yields. This he does by coupling the statistical data with studies of the life history of the species. Difficulty is experienced in making these predictions because the supply (or population) of the species cannot be seen, as is the case with farm animals or crops. The more complete and more reliable the statistics on yield are, the better foundation the biologist has for conducting his studies. The Bureau, therefore, aims to obtain a complete picture of each individual fishery to further these biological studies.

ECONOMIC ASPECT

With the fishery conserved and trends and yields of the fishery predicted there still remains the problem of supplying the fishery trade with the information so essential to the conduct of its business activities. In these days of increasing competition the very existence of the fishery industry must depend upon reliable economic statistical information. Such material has been especially valuable during the past few years, when it has been used in national planning. The Bureau, therefore, aims to make its statistical survey so complete that the industry and the various governmental organizations may turn to it for reliable fishery statistics.

SURVEYS CONDUCTED

The statistical surveys during 1935 were conducted under the direction of Fred F. Johnson, Assistant Chief of the Division, aided by E. A. Power, assistant statistician. These surveys included the collection and dissemination of statistics of the commercial catch and its value, operating units, and employment in the fisheries. In addition, data were collected on employment and compensation of those engaged in, and products of, fishery wholesale and manufacturing establishments.

As previously mentioned, limited funds made it impossible to cover all the fishing areas of the country during the past year for 1934. However, the following areas were surveyed: Chesapeake States, South Atlantic and Gulf States, Pacific Coast States, and Lake States. Statistics of the fisheries of Alaska also were collected by the Alaska Division of the Bureau. Summaries of the production in those sections which were not surveyed during the year are included for the most recent years available in part 2 of this report.

In addition to the above, statistics were collected on the following special phases: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash. (published monthly); landings of halibut at North Pacific coast ports (published monthly); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of canned fishery products and byproducts of the United States and Alaska; transactions on the sponge exchange at Tarpon Springs, Fla.; volume of fishery products handled at the Municipal Fish Wharf and Market, Washington, D. C.; and the volume of the United States foreign trade in fishery products, furnished by the Bureau of Foreign and Domestic Commerce.

The following statistical and marketing agents assisted in the collection and compilation of the statistical data: H. F. Brown, W. H. Brown (deceased), F. F. Dimick, W. H. Dumont, R. L. Greer, V. E. Heffelfinger, B. E. Lindgren, W. H. Rich, V. J. Samson, C. B. Tendick, and A. S. Young.

The reader is especially referred to the section in the latter part of this report entitled "Statistical survey procedure" which gives in detail the methods employed in the collection of fishery statistics and other pertinent information.

TECHNOLOGICAL INVESTIGATIONS

The fisheries constitute a vast source of raw materials for the products of many industries, including the food, drug, paint and varnish, farming (both of animal and plant foods), soap, and many others. Among the industrial commodities derived from aquatic products are: Adrenaline, acetone, agar, alginates, algin, alginic acid, ambergris, pearls, shells and shell products, buttons, salt products, caviar, fish skins and hides, marine leather, marine-animal oils and meals, coral products, epinephrin, fertilizers, glue, pearl essence, insulin, protamine insulinate and other glandular products, iodine, tortoise shell and ivory, isinglass, eelgrass paper, rubber compounds, seal fur, spermaceti, sponges, and many others of a diversified nature and with a wide range of usefulness. Thus it will be seen that technological research in the fisheries covers a broad field which necessarily involves the sciences of chemistry, engineering, bacteriology, pharmacology, and general technology toward the development of new processes and methods, the salvage of waste products, and toward the more complete utilization of the fishery harvest.

LABORATORIES

During 1935, the Division carried on its technological studies under the direction of Dr. J. R. Manning, in charge of technological investigations, at its laboratories located in Washington, D. C., Gloucester, Mass. (later moved to College Park, Md.), and Seattle, Wash. In addition, certain cooperative investigations were conducted by members of our technological staff in the laboratories of the State Medical College at Charleston, S. C., Massachusetts State College at Amherst, Mass., George Washington University, Washington, D. C., University of Maryland and Maryland State Agricultural Experiment Station at College Park, Md., and Western Maryland College at Westminster, Md. On July 1, 1935, our technological laboratory located at Gloucester, Mass., was moved to College Park, Md., in space provided by the University of Maryland at no charge to the Bureau. This laboratory is equipped with all of the appliances which were formerly located at Gloucester, Mass., and is in addition to the nutrition laboratory which was already located at College Park, Md., in space in a separate building provided by the University of Maryland, also at no cost to this Bureau.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

Experimental work during the past year in the preservation of fishery products for food was conducted at the Gloucester laboratory during the first half of 1935 and at the recently established College Park laboratory during the latter half of the year under the supervision of James M. Lemon, associate technologist in charge, assisted by Dr. Francis P. Griffiths, junior bacteriologist; Maurice E. Stansby, junior chemist; S. R. Pottinger, junior technologist; W. J. Hart, William B. Lanham, Jr., Willis H. Baldwin, Hillman C. Harris, Donald A. Bean, and Richard M. Locke, research associates and student assistants; and by Norman D. Jarvis, assistant technologist, in charge of experimental canning research in the Washington laboratory. During the first 9 months of 1935, Dr. Griffiths was detailed to conduct a series of cooperative bacteriological studies at the food products laboratory of the Massachusetts State College, Amherst, Mass.

STUDIES DEALING WITH THE SPOILAGE OF FISH

Studies dealing with the spoilage of fish were continued, attempting to correlate chemical tests with the condition of the fish. Work was limited to two species, the cod and the mackerel. The former is representative of the nonoily fish and its spoilage proceeds in an entirely different manner than do such oily fish as mackerel. It was found that the ammonia content of cod increased fairly regularly with spoilage, and by determining the amount of ammonia present, a valuable auxiliary test for the freshness of cod was available to be used with the electrometric method described in previous reports, as applicable to haddock. It was found that a determination of free amino acids in cod, during spoilage while packed in ice, was of very little value in determining the relative freshness. This is due to the fact that amino acids break down into intermediate spoilage products which are later decomposed. It was found that there was a small initial rise in free amino acid content followed by a slow decrease. Hydrogen sulfide determinations were also found to be of limited value as a test of freshness in cod. In a few cases, significant amounts of hydrogen sulfide were formed, but as a rule, the amounts were almost negligible.

In the case of mackerel, it was found that a determination of the hydrogen sulfide content of the flesh was frequently a good index of the degree of spoilage present. Mackerel frequently feed upon a variety of minute shellfish known to the fishermen, because of the peculiar orange-red color, as "red feed." It was found that fish which had consumed large quantities of the "red feed" upon decomposition gave off considerable quantities of hydrogen sulfide. In some cases, 24 hours after having been caught, appreciable amounts of hydrogen sulfide were found in the flesh of such fish.

In the case of mackerel, the deterioration of the oil must be taken into account. In order to be able to follow the changes occurring in this oil without interference of the protein of the flesh, the oil was extracted from the mackerel and stored under different conditions of temperature and surroundings. It was found that a determination of the peroxide value of the oil could be correlated with the degree of rancidity present if the storage temperature was less than about 65° C. At higher storage temperatures, this method is not applicable. A determination of the free fatty acid content of the oil is in some cases of some value but this test is far less sensitive than the peroxide test. It was found that oil samples stored in a vacuum showed no evidence of deterioration after 1 year's storage. When stored in the presence of carbon dioxide, the rate of oxidation of the oil was retarded. It was found that maleic acid, which is sometimes used for retarding decomposition of oils, had no effect when applied to mackerel oil, but hydroquinone greatly decreased the rate of oxidation of mackerel oil. Enzymes tend to facilitate the oxidation of the oil and, therefore, a preliminary treatment to destroy enzymes decreased the rate of oxidation of the oil, especially at low storage temperatures, but oxidation still proceeded at an appreciable rate.

A quick method for determining the condition of the oil present in fish flesh was developed. This method involves an extraction of the oil by shaking the flesh with ether and sodium sulfate, a process which eliminates the decomposition of the oil usually encountered in the ordinary methods of oil extraction. The extracted oil is then available for chemical tests such as a determination of the peroxide number. The method is suitable for a rapid determination of the oil content of the fish.

ELECTROMETRIC TESTS FOR FRESHNESS OF COD AND POLLOCK

In May 1933 a report was published dealing in considerable detail with a method developed in the laboratory for the determination electrometrically of the relative freshness of haddock.[3] It was stated in that paper that it would be necessary to complete a series of actual tests in order to establish an accurate index which would make the test applicable to other species. During the past year, this was done in the case of cod and pollock showing that the method is applicable for testing the relative freshness of these species.

STUDIES ON SMOKING FISH

A few preliminary studies were begun to determine the effect of the chemical nature of wood smoke relative to its preservative effect upon fish. Sawdust was heated in a combustion furnace and the resulting smoke collected and analyzed. As yet, not sufficient results have been obtained to draw any conclusions.

STUDIES OF RANCIDITY IN FISH

As mentioned in previous annual reports of this Division, our technological staff has been much interested in the causes and prevention of the development of rancidity in fatty fish. Especially has this been a problem in connection with the cold storage of such oily fish as mackerel. As facilities were available and as time would permit, our technologists worked on this problem. Because of the limitations of our facilities and the size of our staff, very little time could be given to this project and its study was pursued only intermittently and in connection with the study of other research problems which were affected by it.

However, late in 1935, the Musher Foundation of New York City, a privately endowed research agency and technical consulting organization, became much interested in the published reports of our technologists bearing on the problem of rancidity in fish. Since the Musher Foundation had also made considerable study of this problem as related to fish and other foods, arrangements were made for a cooperative investigation in our laboratories and research associates were employed by the Musher Foundation to carry on this work. The first phase of the project has consisted of tests of the value of various cereal flours, such as oat and rice flour, as inhibitors of the development of oxidation or rancidity in fatty foods. These cereal products had already been shown to be of value for preventing or retarding the development of rancidity in other oil-bearing or fatty foods, such as salted peanuts, potato chips, and others and it was decided to determine whether they also would be effective in the preservation of several fish, including Boston mackerel, Spanish mackerel, haddock, and mullet. W. J. Hart, research associate for the foundation, was stationed in our College Park technological laboratory for conducting this work. Since the experimental work was not begun until the last of the year, it is too early to report any conclusive results. As described elsewhere in this report, Lyle Anderson, another research associate for the foundation, was stationed in our Seattle technological laboratory to make similar tests of these cereal products on fish livers, fish-liver oils, fish meals, and other miscellaneous byproducts.

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[3] "An electrometric method for detection of relative freshness of haddock", by Maurice E. Stansby and James M. Lemon.

CHEMISTRY OF FISH PROTEINS

Because little is known regarding the chemistry of proteins in fish and shellfish and because this information is badly needed to add to the general knowledge of the food value of these products, a study of this subject was undertaken during the past year. Accordingly, late in 1935, determinations were started at our College Park laboratory of the four nutritionally important amino acids in some of the commercially important fish and shellfish. The amino acids being thus studied are: Cystine, lysine, histidine, and tryptophane. At the same time, digestibility and metabolism experiments with white rats were inaugurated in our nutrition laboratory at College Park to determine, or to learn more about, the biological value of these proteins simultaneously with the study being conducted on the chemistry of such proteins. Also, arrangements for cooperative research were made with Western Maryland College, Westminster, Md., for participation in that part of the program relative to the study of the chemistry of the proteins. Miss Thelma Chell was employed by the Bureau as a part-time graduate student assistant to aid in this work, and the college donated the services of three undergraduate student assistants as its contribution to the cooperative study. In addition, the college provided, free of charge to the Bureau, laboratory facilities, equipment, and chemicals, and the work is being conducted at Western Maryland College under the supervision of Prof. Samuel B. Schofield, head of the chemistry department.

Considerable difficulty was encountered at first in the determinations of the chemical constituents of the fish proteins as very little work has been done on this problem. It, therefore, became necessary for our technologists to modify existing chemical methods or technique (which have been worked out primarily for amino acid determinations of agricultural foods) so as to make them more adaptable to fish. The development of new technique also has been necessary to a certain extent. Therefore, progress on this project necessarily has been slow. However, many determinations have been made of the four above-mentioned amino acids in cod, haddock, mackerel, and Spanish mackerel, but the work has not progressed yet to a point where definite results can be reported. However, there is reason to believe from the data available, that the protein of fish will supplement the deficiencies in other types of protein.

CANNING AQUATIC FOODS

As discussed in the 1934 report of this Division, our general program of the development of suitable and safe methods of home canning various commercially important fish and shellfish has been continued. During the past year, two reports on this work have been prepared. One is Fisheries' Memorandum S-338, entitled "Home Canning of Fish", by Norman D. Jarvis, assistant technologist, and Dr. Francis P. Griffiths, junior bacteriologist. The other report is entitled "The Home Canning of Fishery Products", by Norman D. Jarvis and Francis P. Griffiths. This latter report was published as Fisheries' Investigational Report No. 34, early in 1936. It contains methods recommended for canning salmon, shad, mackerel, lake trout, whitefish, mullet, clams, shrimp, and various fish specialties.

In addition, experimental packs during 1935 have included clam chowder, clam broth, canned cooked salt mackerel (plain and in tomato sauce), mackerel tuna style, mullet in tomato sauce, concentrated salmon chowder, crab gumbo, and crab creole. With respect to these latter two products, there is still the problem of discoloration when an attempt is made to pack the crab meat straight, that is, without any other ingredients or mixtures. Therefore, attention was devoted to working out formulae and methods for products in which crab meat forms only a portion of the contents and the possibility of discoloration of the finished product is correspondingly reduced. Success in eliminating discoloration of canned crab meat has been found in the development of such canned products as deviled crab, crab gumbo, and crab creole. Prospects seem favorable for developing methods suitable for canning at least two of these products on a commercial scale.

Some experimental packs of razor clams received from New England have been made. From preliminary data, it appears that a canned minced clam of good quality can be prepared from the New England razor clam. This shellfish at present is used only as fish bait.

During the past year, a study was begun of existing commercial methods for canning aquatic products with the view toward bringing up to date in a compact report the best technical information available on the subject. As this report will cover a wide field, the compiling of the data will require considerable time to complete.

During the latter part of 1935, our technologist in charge of experimental canning was detailed to assist the North Carolina Fisheries, Inc., Morehead City, N. C., a cooperative organization of North Carolina fishermen, in constructing and operating equipment in their plant for the handling and preservation of fish. This included assistance in developing methods and equipment for handling fresh fish, the smoking and salting of fish, and the canning of fishery products.

BACTERIOLOGICAL STUDIES

Our bacteriological studies have been closely correlated with other investigations of our technological staff as many of these problems require a knowledge of the action of bacteria. These bacteriological investigations have included examinations of the experimental packs of canned fishery products to determine which processes produce sterility, studies of the role of bacteria in the different types of decomposition or spoilage described in preceding paragraphs, with special reference to the studies on mackerel, determinations of the effectiveness of formaldehyde and other chemical preservatives in preventing or retarding the development of bacterial spoilage in fishery byproducts, and other miscellaneous bacterial control problems.

BACTERIAL DECOMPOSITION IN FRESH FISH

The growth of bacteria in flesh foods is one of the most difficult to control. It is probable that this type of spoilage is more costly to the fishing industry than that which takes place within the flesh of the sea food and designated as autolytic or chemical. In view of this, the Bureau has conducted bacteriological tests in an effort to retard this type of spoilage. During the year, Dr. F. P. Griffiths, bacteriologist of the Division, cooperated with Dr. James E. Fuller, professor of bacteriology at Massachusetts State College, in an effort to determine the bacterial flora most commonly found in the contamination of market fish and fillets. The results of this investigation indicate that freshly caught fish which were handled according to approved sanitary methods were not contaminated with *Escherichia Coli*, while fish and fillets which were carelessly handled were found to be contaminated by these organisms.

The results further indicate that fillets were more likely to be infected than round or eviscerated fish. This is to be expected since the skin of the fish is not easily penetrated by ordinary bacterial contamination. Bacteria generally enter the flesh of fish through incisions in the skin such as those made by cutting or forking the fish. It is believed that a combination of the test for *Escherichia Coli*, total bacterial count and the chemical test of freshness index, would prove to be highly satisfactory measures of the sanitary quality of fishery products.

The results of this investigation were presented at the American Public Health Association meeting in October 1935, in a report entitled "Detection and Significance of *Escherichia Coli* in Commercial Fish and Fillets", by Francis P. Griffiths and James E. Fuller. This report was published in the American Journal of Public Health, issue of March 1936.

DISINFECTANTS FOR SPONGES

At the request of the sponge industry two student assistants employed by the National Youth Administration were assigned through the courtesy of George Washington University, Washington, D. C., in 1934, to develop a simple and inexpensive disinfectant which could be used for sterilizing sponges after use. This study was carried on during 1935 in the laboratories of George Washington University as a cooperative investigation of this Bureau and that institution. A disinfectant, consisting of a mixture of formaldehyde, phenol, and chlorine solution, has been found to be effective in sterilizing sponges for the purpose described above.

PHARMACOLOGICAL STUDIES

Because of the increasing importance of the role of some minerals in the metabolism of man and his domestic animals, and because much discussion had appeared in scientific and trade journals concerning the effect of these minerals in human and animal nutrition as they naturally occur in foods such as fishery products and as they occur in organic form, it has become necessary for the Division to conduct investigations in this field. Accordingly, late in 1935, an assistant pharmacologist was appointed to our technological staff; and his work thus far has been in the pioneer development of a new applied science, namely, that of the pharmacology of fishery products. Up to the present, studies have been made of the metabolism of arsenic and copper as they occur naturally in fish and shellfish. As a result of this work, a report was published in the Journal of Nutrition, vol. 10, no. 3, September 1935, entitled "Metabolism in the Rat of the Naturally Occurring Arsenic of Shimp as Compared with Arsenic Trioxide", by E. J. Coulson, assistant pharmacologist, United States Bureau of Fisheries, and Dr. Roe E. Remington and Dr. Kenneth M. Lynch, Medical College of the State of South Carolina, Charleston, S. C.

Investigations of the characteristics of the organic arsenic compound of shimp, including actual feeding tests with both rats and with man, have shown that this compound is very readily absorbed from the gastrointestinal tract, but it is rapidly and almost completely eliminated by the kidneys. Control tests using inorganic arsenic in the form of arsenic trioxide, indicate that this form of arsenic, on the other hand, is absorbed and stored.

The retention of the inorganic arsenic compound was as high as 80 percent during the initial period of feeding. A study of the chemical characteristics of the arsenic compound of shrimp has shown that it is a very stable compound in which the arsenic atom is not ionized. In other words, the arsenic is not in an active state. Thus the arsenic compound of shrimp closely resembles the organic arsenic derivatives of the fatty series which are said to be so stable as to lack something of the therapeutic activity shown by the more dynamic compounds derived from the benzene series, such as atoxyl and salvarsan. The arsenic compound from shimp is soluble in water and readily diffuses through a collodion membrane. It is also soluble in ethyl alcohol and methyl alcohol but insoluble in ether, acetone, and chloroform. The stable, undissociated characteristic of the organic arsenic compound of shrimp and its ready solubility in water, without doubt, account for the rapidity with which it is eliminated from the body.

Thus, there need be no fear of any cumulative toxicity resulting from the organic arsenic as it occurs in shrimp. While the subject has not yet been investigated, it would appear that similar results might be expected from the organic arsenic of other fish and shellfish.

Like studies on the effect of feeding organic copper in the form of "coppery green" oysters have yielded similar results.

This new field of the pharmacology of fishery products promises to yield interesting and important results in future years and in one aspect is closely related to the role of mineral elements in human and animal nutrition. It is no longer safe to evaluate the relative metabolism or assimilability of the mineral content of foods by chemical analyses alone.

PRESERVATION OF FISHERY BYPRODUCTS

The demand for information on the economic utilization of fishery waste materials is increasing. For this reason during 1935, our technologists continued an active investigational program on the preservation of fishery byproducts. Some of these projects were conducted in the Seattle technological laboratory under the direction of R. W. Harrison, associate technologist in charge of that laboratory, with the assistance of A. W. Anderson, assistant technologist, and Lyle Anderson, research associate appointed by the Musher Foundation. Other byproducts investigations were carried on in the Gloucester laboratory and later in the Bureau's College Park laboratory under the supervision of J. M. Lemon, in charge of that laboratory, by S. R. Pottinger, junior technologist, and George Tarrant, Harold E. Crowther, and Joseph F. Puncochar, research associates appointed by L. T. Hopkinson, Washington, D. C. Mr. Tarrant has chemical training and Messrs. Crowther and Puncochar are bacteriologists. These various investigations are described in succeeding paragraphs.

UTILIZATION OF SALMON CANNERY WASTE

Approximately 200,000,000 pounds of salmon waste are at present discarded each year. Complete utilization of this material would provide the basis for an industry which would manufacture products having a value exceeding $1,000,000 annually.

In the past, numerous attempts have been made toward utilization of this material but in only a very few cases were the efforts successful. Many of these failures can be attributed to a lack of understanding of the reduction problem as required by salmon waste and also to a lack of appreciation of the potential value of salmon byproducts. Nevertheless a psychological state of mind has arisen which has retarded further attempts of development on the part of the industry.

Realizing the great benefit the United States and Alaska would derive from an industry of the magnitude indicated by the amount of salmon waste material available and appreciating the effects of past experiences of the industry, the Bureau has continued its investigation of the problem with considerable deliberation and caution, in order to assure a sound basis for future development.

In this connection our technologists have endeavored to investigate those phases of the reduction problem which caused difficulty in the past, have worked on methods for overcoming these obstacles, and are continuing a comprehensive study of the potential value of the manufactured products which may be expected as a result of proper operating methods.

In our last report information was given with respect to the distribution of fat and vitamins in salmon waste, the potential value of each species and progress on specific specialized products. These data have provided the industry with certain fundamental facts concerning the relationship of the nature of the raw material to the quality of the products to be obtained, as well as a guide to the possibilities and limitations of specialized operations.

Subsequent investigation has dealt largely with the reduction process and its relationship to the efficiency of salmon waste utilization.

These studies have indicated that effective cooking can be accomplished without detriment to vitamins in the oil, have established the feasibility of screening and mechanically separating salmon press liquors, and have demonstrated means of improving both oil recovery and the vitamin potency of the oil.

At the present time, attention is being given to a study of the retention of vitamins A and D in the oil in salmon meal. If methods can be developed whereby the fat in the meal can be prevented from becoming rancid, and vitamin A and D values retained during storage, it would be entirely possible to produce salmon meals which would carry sufficient vitamin A and D unitage to preclude the necessity of adding any further supplement of these vitamins to the diet. Meals of this type would be expected to carry a higher vitamin G value also and would thus be of unusual value in poultry feeding. All such work on fish meal also is valuable in rendering this product more suitable for feeding fish reared in hatcheries.

MANUFACTURE AND NUTRITIVE VALUE OF NONOILY FISH MEALS

Previous issues of this publication have carried progress reports of an extended investigation dealing with the manufacture of fish meal from nonoily fish waste and the effect of manufacture on the composition and nutritive properties of these meals. During the past year the assembled data were incorporated in report form and published in the Investigational Report series of the Bureau. Since these papers are now available to the public, interested persons are referred to the following publications obtainable from the Government Printing Office: Fisheries' Investigational Report No. 30, entitled "Effect of Manufacture on the Quality of Nonoily Fish Meals"; Fisheries' Investigational Report No. 31, entitled "Effect of Method of Manufacture on the Composition of Haddock Fish-Meal Proteins"; and Fisheries' Investigational Report No. 32, entitled "Studies on Drying Cod and Haddock Waste."

PREPARATION OF AUTHENTIC HALIBUT-LIVER OIL SAMPLES

During the year, the Bureau was asked by the Food and Drug Administration and the Bureau of Chemistry and Soils to prepare a number of authentic halibut-liver oil samples extracted from livers of halibut taken in different localities at intervals throughout the fishing season. The work was arranged and carried out through our Seattle technological laboratory

Eight liver samples were taken from an area bounded on the south by Cape Shoalwater, on Willapa Harbor, and on the north by Cape Spencer, in Southeastern Alaska, designated as area 2 by the International Fisheries Commission. Ten samples were taken from area 3, the area between Cape Spencer and Cape Sagak in the Aleutian Islands and two samples from the small area south of area 2.

The livers from area 2 varied in fat content, as indicated by ether extraction of samples of liver which had been desiccated under reduced pressure, from 22 to 42 percent, the majority being around 30 percent. Samples were taken at intervals between July and November, inclusive. The livers from area 3 varied in fat content as determined above between 13 and 31 percent. Sampling extended from July to January 1, 1936. The two remaining samples contained 14 percent and 25 percent fat.

Although not consistent, the data indicate that halibut livers increase in fat content from summer to mid-fall and then decrease to the close of the season in November or December. Preliminary data on samples of oil tested in the laboratory indicate variation in certain chemical constants and vitamin A values ranging through wide limits. A more complete study is being made.

EXTRACTION OF OIL FROM HALIBUT LIVERS

Halibut livers do not give up oil by simple heat treatment, as do the livers of cod and related fish. For this reason, solvent extraction was used in the first stages of the industry's development. During the past 3 or 4 years, the several manufacturers of halibut-liver oil have developed effective methods of oil extraction without recourse to solvents, with a resultant improvement in the quality and appearance of the oil.

In order that the oils referred to in the preceding section would be representative of the grade of oil entering commerce at the present time our technologists were required to give considerable attention to methods of extraction. Most effective and rapid results were obtained by first disintegrating the livers mechanically without emulsification, autoclaving for a short time in an acid medium to break down further the liver tissue, making the solution slightly alkaline, and reheating for a short period and centrifuging.

The livers were found to vary considerably in physical condition and consequently with ease of extraction. For this reason further discussion of the experimental procedures used and their efficacy will be reserved for our regular report series where they can be discussed in detail at the completion of the investigation.

VARIATION IN THE FAT CONTENT OF HALIBUT

On several occasions during the past year the bellies of halibut held for storage were observed to become bluish and more or less mottled in appearance when frozen. Such fish were considered unmarketable by the trade since the bellies of frozen halibut are expected to be unblemished white in color.

Specimens of such fish were submitted for the attention of the technologists in our Seattle laboratory, and it was found that the discolored appearance was due to the belly skin becoming more or less transparent when the fish were frozen. This resulted in the flesh immediately beneath the skin showing through. Upon further examination and laboratory tests the fish were found to be particularly lean with practically no fat storage adjacent to the belly skin as is the case in a normal fish.

Since this extreme variation in fat content had resulted in marketing losses and has possible relation to the biological work of the International Fisheries Commission in the study and regulation of the halibut fishery, our Seattle technological laboratory began an investigation of this problem in cooperation with the commission. Periodic samples of small, medium, and large halibut have been taken at intervals throughout the season, from the various halibut grounds and are being examined for fat content. Sufficient data are not as yet available to warrant discussion at this time.

FISH FOOD FACTORY

As mentioned previously in this report the increasing costs of animal livers, hearts, spleens, and other slaughter wastes used as fish foods has given rise to a financial problem in hatchery operation. During the past year the Bureau's Division of Fish Culture became interested in the possibility of preparing supplemental dried food from spent salmon after egg taking, which would permit a reduction in raw food requirements. In this connection, the technologists in our Seattle laboratory were called upon to cooperate in designing and preparing specifications for a factory which was installed at the Bureau's Quilcene, Wash., hatchery. This was operated during the past egg-taking season and handled in a satisfactory manner the prescribed amount of approximately 1½ tons of raw fish per day. The output of the factory is being used regularly in the ration of fish reared at various Bureau hatcheries at a considerable saving to the Bureau for fish foods.

RANCIDITY STUDIES OF HALIBUT LIVERS, LIVER OILS, AND OTHER FISHERY BYPRODUCTS

Beginning November 1, 1935, the Musher Foundation, Inc., of New York, appointed a research associate in our Seattle laboratory, for the purpose of studying the prevention of rancidity and general deterioration of fish-liver oils, fish oils, and other fishery byproducts by the treatment or incorporation of especially prepared cereal flours for which the foundation holds patents. The laboratory work which is being done by a graduate student of the University of Washington under the direction of the technologist in charge of the laboratory, has not yet reached the stage where any conclusions can be drawn.

CHEMICAL PRESERVATION OF FISH WASTE

Fish waste and waste fish, usually resulting from the operation of fishery industries primarily engaged in the manufacture, preparation, and preservation of various edible fishery products for food, have in many cases gone unutilized and sometimes also have presented a disposal problem because not enough of the trimmings or waste would be available to justify the cost of installation and operation of suitable byproducts equipment for converting this raw material into such useful commodities as fish meal, fish oil, etc. In view of this, much interest is being shown in the possibilities of partially or temporarily preserving this waste until it can be collected at a central point for mechanical reduction into meal, oil, and other byproducts. Therefore, late in 1935, a cooperative investigation of the value of certain chemicals in the preservation of fish waste was undertaken by our technologists in our College Park laboratory with L. T. Hopkinson, Washington, D. C., who had developed certain methods for the application of these chemicals on board ships. Accordingly, three research associates were employed by Mr. Hopkinson to carry on this project under the general supervision of our technological staff. These research associates are: George E. Tarrant, chemist, and Harold E. Crowther, Joseph F. Puncochar, bacteriologists. Chemical data are being obtained to determine the effectiveness of the chemicals being studied and their chemical reactions on the protein and other ingredients of the fish waste and bacteriological studies are being undertaken to determine the effectiveness of these chemicals and in preventing or retarding bacterial spoilage.

Among the chemicals which have been studied thus far are formaldehyde and acetaldehyde. This work has not progressed to a point yet where any definite results can be reported. The effect of chemical preservation on the feeding value of fishery byproducts is being tested with farm animals at the Virginia State Agricultural Experiment Station, Blacksburg, Va., and with experimental animals in our nutrition laboratory at College Park, Md.

NUTRITIVE VALUE OF AQUATIC PRODUCTS

Since a large part of our technological investigations is devoted to food research, studies of the various nutrition or food factors in aquatic products are an essential and important part of our investigative program. In fact this phase of our program must be closely coordinated with other technological investigations as the relative nutritive value of experimentally prepared and preserved fishery products is the only true yardstick or standard of measurement for evaluating improvements in methods of manufacture, preservation, handling, and storage of such products.

During 1935 our nutrition investigations were carried on in our College Park laboratory, in the laboratories of the State Medical College, Charleston, S. C., and in the laboratories of the Massachusetts State College, by Charles F. Lee, E. J. Coulson, and Dr. Francis P. Griffiths, of the technological staff, and by student assistants.

FISH-LIVER OILS

Most of the work in our nutrition laboratory at College Park, Md., consisted of studies of the content of vitamins A and D in experimentally prepared fish-liver oils forwarded from other technological laboratories of the Bureau. These liver oils consisted of halibut, swordfish, haddock, and salmon. Several series of samples of oils from cooked and uncooked swordfish livers were examined to determine the effect of different solvents, used in extracting the oils from the livers, on the vitamin potency of the extracted oils. It was found that such solvents as petroleum ether, ethyl ether, and ethylene dichloride, produced the best oils.

The tests cf the effect of these solvents on the vitamin potency of extracted oil proved to be very accurate because in three cases where livers were extracted several times with the same solvent, the oils derived from each fraction were identical in vitamin content.

Twenty-three samples of salmon oils prepared by our temporary technological laboratory in Alaska during the summer of 1934 were studied for their content of vitamins A and D. Tests also were made on 13 salmon oils, being used at the same time in poultry feeding tests in Washington State College in a cooperative project with this Bureau. These salmon oils varied over a wide range in vitamin potency from 120 to about 900 international vitamin A units per gram for the oils prepared in Alaska and from 110 to 2,400 international vitamin A units per gram for the oils in the group from Washington State College. The vitamin D potency of the oils in both groups ranged from 40 to 120 international vitamin D units per gram. This average was somewhat lower than the vitamin potency reported for salmon oils previously tested and reported in previous annual reports of this Division.

As described previously in this report, the Bureau's technologists, during 1935, began a cooperative study of halibut-liver oils at the request of the Bureau of Chemistry and Soils and the Food and Drug Administration of the United States Department of Agriculture. Chemists of both of these Bureaus are working with our technologists, and the purpose is to standardize the production and testing of halibut-liver oil so that authentic samples may be available for control work in administering the food and drug laws.

Therefore, our nutrition laboratory determined the content of vitamins A and D in eight samples of halibut-liver oil experimentally prepared by our Seattle laboratory in connection with this cooperative project. It is expected that it will be necessary to assay about 20 halibut-liver oil samples to complete the study. Incomplete tests on the first eight halibut-liver oil samples show considerable variation in vitamin A content with the highest sample running about 90,000 international vitamin A units per gram and other samples ranging down to less than 30,000 units. Vitamin D potencies of these oils ranged from 2,000 to 3,000 international units per gram.

The investigation of the chemical and physical properties and vitamin potency of haddock-liver oil begun in 1934 was completed during the past year. The results of this study were published in Fisheries' Investigational Report No. 27, entitled "Chemical and Physical Properties of Haddock-liver Oil and Its Vitamin Content." In brief, this study indicated that the U. S. P. requirements should be changed as to haddock-liver oil if this oil is to be included in cod-liver oil along with the liver oils from other members of the family Gadidae.

MENHADEN OIL FOR POULTRY FEEDING

In cooperation with the chemistry department of the University of Maryland, an investigation was undertaken to determine the possibility of using menhaden fish oil in poultry feeding. Menhaden fish oil is produced by one of our large domestic fishery industries in factories along our Atlantic coast. Several samples of menhaden oils from various factories were tested for vitamin D content on white rats and also on baby chicks. These oils, although not especially prepared to preserve their vitamin potency, were with few exceptions equal to cod-liver oil in vitamin D content and, therefore, are of great value in poultry nutrition. Such oil now goes into the soap kettle and into other industrial uses. A report on these tests entitled "Menhaden Oils as an Antirachitic Supplement for Poultry", by W. C. Supplee and Charles F. Lee, has been published as Bulletin No. 389 of the University of Maryland Agricultural Experiment Station.

MENHADEN FISH MEAL IN CATTLE FEEDING

In a cooperative arrangement with the Bureau, the dairy department of the Maryland State Agricultural Experiment Station began, in 1934, an investigation of the value of menhaden fish meal in the feeding of calves and yearling heifers. Menhaden fish meals, prepared according to different methods of manufacture, have been obtained for this test from various factories. Results thus far have indicated that both flame-dried and steam-dried menhaden meals are valuable ingredients in the dairy ration. A full report on this work will be published by the Maryland State Agricultural Experiment Station and this Bureau in the Journal of Dairy Science.

STUDIES OF THE CHEMISTRY AND NUTRITIVE VALUE OF FISH PROTEINS

As discussed in a previous section of this report, our College Park laboratory, late in 1935, began a study of the constituents of fish proteins. This project not only includes a determination of the nutritionally important amino acids in the proteins of various species of fish and shellfish, but also digestibility and metabolism studies have been begun in our nutrition laboratory to determine the biological value of these proteins. As indicated previously, this work has not progressed to a point where any results can be reported.

NUTRITIVE VALUE OF MACKEREL

A preliminary study of the nutritive value of the edible portion of mackerel was made during 1935 by William H. Conway, Jr., in the food products laboratory of the Massachusetts State College, Amherst, Mass., in cooperation with our technological staff. This work was supervised jointly by Dr. C. R. Fellers, of Massachusetts State College, and Dr. F. P. Griffiths, of the technological staff. Mr. Conway, a student assistant, was assigned to this study by the National Youth Administration through the courtesy of the Massachusetts State College. The results of this investigation are reported in a thesis entitled "Studies on the Nutritive Value of Mackerel", by William H. Conway, Jr., and submitted to the college. It was found that mackerel is a good source of protein and that mackerel flesh is a fair source of vitamins A and D, although not quite as good a source of these vitamins as some other fish.

MINERAL CONSTITUENTS IN FISHERY PRODUCTS AND BYPRODUCTS

During 1935, E. J. Coulson, of our technological staff, stationed in the laboratories of the State Medical College, Charleston, S. C., continued his study of the mineral constituents in various fishery products and byproducts. This work not only included chemical determinations of the amount of these various mineral constituents in the different products studied, but also included tests of the nutritive value of these minerals with experimental animals. Determinations of the iodine content of most of the important products were completed and the results were published in Fisheries' Investigational Report No. 25, entitled "The Iodine Content of Some American Fishery Products." This report contains determinations of the iodine content of about 25 kinds of fishery products.

Studies of the iodine of haddock flesh and oysters, as compared with the iodine of milk and iodine in the inorganic form of potassium iodide indicated that the iodine from these various sources was equally assimilable and that the effectiveness of iodine from these sources, when fed at minimum effective doses, was about equal in the prevention of goiter in the white rat, the experimental animal utilized in these tests.

Determinations of other mineral constituents in fishery products, such as calcium, phosphorus, iron, copper, etc., are being made as rapidly as possible, and it is hoped that enough data will be available for publication in 1936. Other chemical and biochemical studies of these mineral constituents are discussed in a preceding section of this report under "Pharmacological studies."

FISH COOKERY STUDIES

Our fish cookery laboratory continued the development and testing of recipes for various fishery products begun in 1934. The cookbook, referred to in previous reports of the Division, was completed and published as Fishery Circular No. 19, entitled "Practical Fish Cookery", by Agnes I. Webster and W. T. Conn. The demand for this cook book has exceeded the supply. However, through the cooperation of the Fish and Seafood Institute of the United States, over 60,000 copies have been distributed, mainly to home economics workers in schools and colleges. In addition to this work, our fish cookery expert carried on educational work and practical demonstrations in the preparation and cooking of fish and shellfish in cooperation with home economics workers in various cities. During the latter part of 1935, she was detailed to cooperate with R. H. Sullivan, of the Massachusetts State Department of Agriculture, in carrying on demonstrations in fish cookery and giving educational talks on the nutritive value of fish at schools, women's clubs, and various other gatherings in the State of Massachusetts.

In cooperation with the manager of the large cafeteria in the Department of Commerce Building in Washington, seafood dishes, popular in many public eating places, were prepared on a large scale and sold through the cafeteria under such an arrangement that constructive criticisms and suggestions were received from patrons. From this test, it was possible to obtain a wide popular reaction to the results of the Bureau's fish cookery work. Much favorable comment was received from this test and the cafeteria manager reported that it had stimulated sales of fish and shellfish dishes. As the result of this practical test and other laboratory tests of recipes on a large scale, a mimeographed pamphlet or cookbook was issued by the Bureau of Fisheries as Special Memorandum 3216, entitled "Cooking Fish For One Hundred", by W. T. Conn, technologist.

RESEARCH ASSOCIATES AND STUDENT ASSISTANTS

Because of the relatively small size of the Bureau's technological staff and the rather broad field of research it must cover, it is only possible to undertake those problems which are of a fundamental nature and which promise to be of the greatest value to the largest number of persons (whose livelihood depends in whole or in part on the fisheries), and which are possible with the funds and personnel available. For this reason, the Division cannot, with present facilities, attack problems of special or restricted interest affecting certain products, processes, methods, or industries. However, the Bureau has available, by congressional authorization and under an arrangement similar to that of other scientific Government bureaus, facilities for research associates and student assistants in its laboratories. The salaries and expenses of these employees are paid by the firms or groups who are interested in the problems on which they are working and the investigations are carried out under the supervision of the Bureau's technologists in its laboratories and under its control. Thus the Bureau provides these industries and groups with laboratory, consulting, and library facilities which, in most instances, cannot be obtained elsewhere.

Within the limits of its facilities, the Bureau also has opened its technological laboratories to research students who are pursuing courses in universities and who are selecting investigational problems in the fisheries as their major study. This may prove of special benefit to the industry as it brings its problems to the attention of a large group of research workers who in turn may spread interest to applied fishery research.

The following research associates and student assistants carried on investigations under the supervision of our technological staff during the past year. The details of these problems have been described in the preceding pages.

In the Seattle technological laboratory, Lyle Anderson, research associate employed by the Musher Foundation, Inc., New York City, working on the problem of rancidity in fish livers, oils, and meals; Myron Thurman and Richard Crosby, student assistants, provided by the National Youth Administration, through the University of Washington.

In the College Park laboratory, W. J. Hart, research associate, employed by the Musher Foundation, Inc., New York City, working on the problem of rancidity in fatty fish; George Tarrant, Harold E. Crowther, and Joseph F. Puncochar, research associates, employed by L. T. Hopkinson, Washington, D. C., working on problems in the chemical preservation of fishery byproducts; William B. Lanham, Jr., Hillman C. Harris, and Willis H. Baldwin, part-time graduate student assistants, employed by the Bureau of Fisheries and working on problems in the chemistry and metabolism of fish proteins; James W. McCurley, Roscoe Dwiggins, Robert D. Nichols, G. E. Linthicum, Amiel Kirshbaum, Raymond N. Miskimon, George W. Dorr, H. H. Hemsley, C. R. Langmaid, George W. Knepley, Walter Schauffele, Wade Wood, Ned Oakley, Abraham Scop, A. N. Chumbris, K. Krulevitz, Edward J. Kennedy, John Webster, and T. M. Scharf, student assistants provided by the National Youth Administration through the University of Maryland.

In the laboratory of the State Medical College at Charleston, S. C., Cecil Leroy Smith, chemist, provided by the Works Progress Administration through the State Medical College and assisting Mr. Coulson of our technological staff in studies of the pharmacology and nutritive value of mineral constituents in fishery products.

At George Washington University, Washington, D. C., William H. Conway and William J. P. Howard, senior medical students provided by the National Youth Administration through the university and working on the problem of the development of disinfectants for sponges for household use.

At Western Maryland College, Westminster, Md., Miss Thelma Chell, graduate student assistant, employed part time by the Bureau of Fisheries and studying the chemistry of fish proteins; William F. Coleman, Miss Helen H. Frey, and Miss Louella H. Mead, student assistants provided by the National Youth Administration through Western Maryland College and assisting Miss Chell in her study of fish proteins.

During the first half of 1935 while the Division was maintaining a technological laboratory at Gloucester, Mass., the Bureau obtained from Northeastern University, Boston, Mass., for work in the Gloucester laboratory, Donald A. Bean and Richard M. Locke, student assistants, who spent alternately 5 weeks in the university pursuing the regular school curriculum and 5 weeks in our laboratory aiding in the conduct of research problems pertaining to fish preservation and spoilage.

At Massachusetts State College, Amherst, Mass., William H. Conway, Jr., student assistant provided by the National Youth Administration through the college and working on the study of the nutritive value of mackerel.

EDUCATIONAL AND CONSULTING SERVICES

In addition to the activities described in this report, our economic and technological staffs conduct an educational and consulting service for those interested in the fisheries. Some of these functions and services have been discussed or referred to in previous paragraphs of the report. In addition, various members of the staff have conducted lectures and practical demonstrations relative to the fisheries and the fishery industries at various State educational institutions and at public gatherings of various sorts. Also, members of the staff deliver radio addresses on various fishery subjects from time to time. The Bureau or the Division also answered many thousands of letters on fishery subjects and has supplied information to persons who have called at the Bureau, personally. Many of the latter have come from foreign lands to seek information on the conduct of the fishery industries in the United States, which might be useful in the more orderly conduct of the fisheries of their native lands.

FISHERY SCHOOLS OF INSTRUCTION

During the months of January, February, and March 1935, the division of markets of the Massachusetts State Department of Agriculture conducted schools of instruction in handling fish. The members of the staff of the Gloucester, Mass., technological laboratory cooperated with the State officials in this work. These schools were designed particularly for the instruction of the retail dealers of fishery products in the latest methods of sanitation and handling of these products. There were also included suggestions as to attractive methods of displaying and cooking the various species of fish and shellfish. The courses of instruction were conducted semiweekly in widely separated cities throughout the State. Considerable interest was shown by the industry and it is believed that the benefits derived were more than adequate to compensate for the effort.

PUBLICATIONS OF THE DIVISION

During the calendar year 1935 the following publications were prepared and addresses delivered by members of the Division's staff. These do not include the monthly statistical bulletins of the landings of fishery products at Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish and quantities of fish frozen. The fishery reports and circulars may be purchased at the prices shown from the Superintendent of Documents, Government Printing Office, Washington, D. C. The statistical bulletins and special or S-memoranda are distributed free of charge upon request to the Bureau. The special articles may be obtained from the sources of publication.

Those wishing to receive current copies of this report and statistical bulletins issued by the Bureau should request that their names be placed on the Bureau's mailing lists nos. 128 for the annual statistical report, 128a for general statistical bulletins, and 128b for monthly cold-storage reports. Those desiring historical statistical data on the domestic fisheries for the period 1880 to 1929 should consult the report entitled "Fishery Industries of the United States, 1930", by R. H. Fiedler, Appendix II to the Report of the United States Commissioner of Fisheries for the Fiscal Year 1931. Statistical information for the years 1930 to 1933, inclusive, may be obtained from the annual reports of the Division for the years 1931 to 1934, inclusive.

DOCUMENTS, REPORTS, AND CIRCULARS

Anderson, Andrew W., Roger W. Harrison, and S. R. Pottinger.
Studies on drying cod and haddock waste. 8°, 41 pp., 7 figs. Investigational Report No. 32. 5 cents.

Coulson, E. J.
The iodine content of some American fishery products. 8°, 7 pp. Investigational Report No. 25. 5 cents.

Fiedler, R. H.
Fishery industries of the United States, 1934. 8°, 330 pp. Appendix II to Report of Commissioner of Fisheries, 1935. 20 cents.

Harrison, Roger, W., S. R. Pottinger, Charles F. Lee, and Andrew W. Anderson.
Studies on the utilization of swordfish livers. 8°, 10 pp., 3 figs. Investigational Report No. 28. 5 cents.

Harrison, Roger W., Andrew W. Anderson, and S. R. Pottinger.
Effect of manufacture on the quality of nonoily fish meals. 8°, 30 pp. Investigational Report No. 30. 5 cents.

Jarvis, Norman D.
Fishery for red snappers and groupers in the Gulf of Mexico. 8°, 29 pp., 4 figs. Investigational Report No. 26. 5 cents.

Pottinger, S. R., Charles F. Lee, Chester D. Tolle, and Roger W. Harrison.
Chemical and physical properties of haddock-liver oil and its vitamin content. 8°, 16 pp., 6 figs. Investigational Report No. 27. 5 cents.

Pottinger, S. R., Roger W. Harrison, and Andrew W. Anderson.
Effect of method of manufacture on the composition of haddock fish-meal proteins. 8°, 14 pp., 1 fig. Investigational Report No. 31. 5 cents.

Webster, Agnes I., and W. T. Conn.
Practical fish cookery. 8°, 26 pp. Fishery Circular No. 19. 5 cents.

SPECIAL ARTICLES AND ADDRESSES

Conn, W. T.

Cooking fish for one hundred. Bureau of Fisheries' Special Memorandum 3216.

Florida fish on the table. Address before the Women's Institute at the Florida State College for Women, June 19, 1935, Tallahassee, Fla.

Acres of diamonds. Address at the annual meeting of the Florida Fisheries Association, June 24, 1935. Orlando, Fla.

Problems of the Florida fishermen. Address at the State Convention of the Union Fishermen of Florida, Dec. 10, 1935. Sarasota, Fla.

The natural craving for seafood. Radio address delivered over Station WJAX, Dec. 16, 1935. Jacksonville, Fla.

Coulson, E. J.

The elimination of arsenic from shrimp, and inorganic arsenic in man and in the rat. Address before the Chemistry Section, South Carolina Academy of Science, Columbia, S. C., April 6, 1935. Abstracted in Bulletin of the South Carolina Academy of Science, vol. 1, 1935.

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Part 2. FISHERY STATISTICS, 1934

GENERAL REVIEW

Based upon available statistics for 1934, there was a large increase in the catch of fishery products in the United States and Alaska as compared with the preceding year. Statistics of the catch were collected for both 1933 and 1934 in the Chesapeake, Pacific, and Lake States and in Alaska, and when considering the combined catch of these sections alone, an increase of 50 percent in the volume and 33 percent in the value of the catch is indicated. While these increases are reflected in each of the four geographical sections and in many species, they are especially important in increased catches of pilchard, mackerel, and tuna and tunalike fishes in California. The value of the production of canned fishery products in all sections increased 34 percent as compared with 1933; byproducts increased 29 percent; and frozen fish about 50 percent. The value of the production of packaged fish also increased.

The total catch of fishery products in the United States and Alaska as based on the most recent surveys, amounted to 3,950,779,000 pounds, valued at $74,163,000. About 123,000 fishermen were employed in making this catch.

In 1934 in the United States and Alaska, the production of canned fishery products amounted to 700,157,272 pounds, valued at $80,021,342; the output of byproducts was valued at $22,608,219; and the production of frozen fishery products, excluding packaged products, amounted to 97,290,184 pounds, estimated to be valued at $8,500,000. Based on the most recent surveys the production of cured fishery products amounted to 98,141,332 pounds, valued at $13,047,069, and fresh and frozen packaged fish and shellfish 150,592,819 pounds, valued at $20,678,362. It is estimated that about 650,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about $52,000,000 were marketed during 1934. The total marketed value to domestic primary handlers of all fishery products in 1934 is estimated at nearly $200,000,000.

Fishery products imported for consumption were valued at $30,789,995 and domestic exports were valued at $13,821,781.

New England States.—No survey for the entire catch of fishery products in these States was made for 1934. In 1933 the volume of the catch showed an increase over the preceding year, but the value decreased. There were increases in both the volume and value of the combined landings of fishery products by vessels at Boston and Gloucester, Mass., and Portland, Maine, during 1934, and there were large increases in the production of Maine sardines, and frozen fish.

Middle Atlantic States.—No survey for the catch of fishery products in these States was made for 1934. In 1933 there was an increase in both volume and value of the catch as compared with the preceding year. There was an increase in the production of frozen fish during 1934 but a small decrease in the catch of shad in the Hudson River.

Chesapeake Bay States.—In 1934 the catch of fishery products in the Chesapeake Bay States increased as compared with the catch in 1933. The value of menhaden products which are produced in Virginia increased appreciably, however, the catch of shad in the Potomac River decreased sharply.

South Atlantic and Gulf States.—The catch of fishery products in the South Atlantic and Gulf States during 1934 showed a large increase in both volume and value over 1932 when the first preceding survey of the catch was made. There also were increases in the output of canned oysters and shrimp.

Pacific Coast States.—Statistics of the Pacific Coast States for 1934 show the largest volume of catch of fishery products of any year on record and the value was the largest since 1930. There were also increases in the packs of canned salmon, sardines, mackerel, tuna and tunalike fishes, and frozen fish.

Lake States.—In 1934 the catch of fish in the Lake States exceeded that of any year since 1918. The catch of lake herring and yellow perch was especially large.

Mississippi River and tributaries.—The most recent complete catch statistics of the fisheries of the Mississippi River and tributaries are those collected for the year 1931. As compared with 1922 when the most recent preceding survey was made, there was a decrease in the catch which was reflected principally in a smaller catch of fresh-water mussels. A survey made for Lakes Pepin and Keokuk and the Mississippi River between these two lakes showed a decrease in 1934 as compared with the preceding year. The production of mussel-shell buttons decreased in 1934.

Alaska.—The catch of fishery products in Alaska in 1934 increased in both volume and value as compared with 1933. The pack of canned salmon was much larger in 1934 in both volume and value than in the preceding year. There also were increases in the production of fresh and frozen fish, and fishery byproducts; however, there was a decrease in both the volume and value of cured products.

Fisheries of the United States and Alaska

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Product	New England, 1933, Area XXII		Middle Atlantic, 1933, Area XIII		Chesapeake, 1934, Area XXIII		South Atlantic and Gulf, 1934, Areas XXIV and XXV		Pacific, 1934	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	461, 621	9, 593	142, 771	2, 266	210, 618	2, 215	288, 015	4, 435	1,522,817	18, 289
Shellfish, etc	38, 315	3, 893	26, 982	2, 545	78, 393	3, 728	159, 899	5, 559	19, 287	1, 569
Whale products									3, 998	92
Total	499, 936	13, 486	169, 753	4, 811	289, 011	5, 943	447, 914	9, 994	1,546,102	19, 950

Product	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1934		Total for the various years	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	93, 241	5, 068	44, 062	2, 257	807, 183	11, 541	3, 570, 328	55, 664
Shellfish, etc	3, 170	56	38, 321	640	2, 732	166	367, 099	18, 156
Whale products					9, 354	251	13, 352	343
Total	96, 411	5, 124	82, 383	2, 897	819, 269	11, 958	3, 950, 779	74, 163

NOTE.—The roman numerals appearing under the names of the sections are the numbers given these areas by the North American Council on Fishery Investigations. It should be explained that there are included under these areas craft whose principal fishing ports are in the respective areas but at times they may fish elsewhere.

OPERATING UNITS: BY SECTIONS

Item	New England, 1933	Middle Atlantic, 1933	Chesapeake, 1934	South Atlantic, and Gulf, 1934 [1]	Pacific, 1934
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5, 049	2, 442	2, 132	2, 914	6, 914
On boats and shore	12, 024	6, 132	18, 459	21, 984	12, 318
Total	17, 073	8, 574	20, 591	24, 898	19, 232
Vessels:					
Steam	24	19	26		3
Net tonnage	2, 879	3, 010	2, 937		64
Motor	570	384	115	710	946
Net tonnage	16, 602	6, 121	1, 688	8, 789	26, 315
Sail	1	4	136	30	5
Net tonnage	47	32	1, 513	298	2, 170
Total vessels	595	407	277	740	954
Total net tonnage	19, 528	9, 163	6, 138	9, 087	28, 549

[1] Includes the fisheries of Lake Okeechobee, Fla.

Fisheries of the United States and Alaska—Continued

OPERATING UNITS: By sections—Continued

Item	New England, 1933	Middle Atlantic, 1933	Chesapeake, 1934	South Atlantic, and Gulf, 1934	Pacific, 1934
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	4, 581	1, 747	6, 865	6, 309	5, 465
Other	3, 819	2, 123	5, 852	8, 089	908
Accessory boats	1, 227	157	96	198	750
Apparatus:					
Haul seines	79	249	488	852	131
Purse seines	178	27	32	40	456
Lampara nets					213
Otter trawls (including all types and sizes)	566	197	25	3, 051	26
Beam trawls					27
Paranzella nets					15
Gill nets	7, 348	1, 529	10, 849	10, 581	4, 024
Trammel nets				425	48
Pound nets, trap nets, and weirs	457	574	2, 341	1, 551	454
Stop nets		96	2	9	
Fyke nets	121	2, 667	2, 640	490	2, 075
Bag nets and pocket nets	144				
Other nets [3]	423	433	3, 712	14, 486	454
Hooks, baits, or snoods	3, 617, 680	622, 304	2, 020, 400	609, 206	1, 153, 962
Fish wheels				33	27
Eel pots and traps	4, 774	7, 324	13, 583	790	
Brush traps				25, 250	
Lobster pots	319, 460	46, 576			6, 520
Crab, shrimp, crawfish pots, traps, drags, etc	3, 407	10		2, 654	21, 784
Clam dredges	75	90		1	
Crab dredges		86	200		
Mussel dredges	1	2			
Oyster dredges	107	353	690	662	4
Scallop dredges and drags	2, 569	260		6	
Crab scrapes			586		
Tongs, rakes, hoes, forks, picks, grabs, etc	4, 509	3, 229	10, 294	2, 877	3, 457
Diving outfits				53	19
Crowfoot bars					
Other apparatus [5]	3, 007	200	2	4, 473	53

Item	Lakes, 1934	Mississippi River and tributaries, 1931	Alaska, 1934	Total for the various years
Fishermen:	*Number*	*Number*	*Number*	*Number*
On vessels	1, 703		[2] 9, 433	30, 587
On boats and shore	5, 876	15, 884		92, 677
Total	7, 579	15, 884	9, 433	123, 264
Vessels:				
Steam	76		7	155
Net tonnage	1, 716		541	11, 147
Motor	414		629	3, 768
Net tonnage	4, 581		8, 814	72, 910
Sail				176
Net tonnage				4, 060
Total vessels	490		636	4, 099
Total net tonnage	6, 297		9, 355	88, 117
Boats:				
Motor	1, 720	4, 426	1, 022	32, 135
Other	1, 350	10, 120	3, 253	35, 514
Accessory boats	18			2, 446
Apparatus:				
Haul seines	254	1, 013	140	3, 206
Purse seines			553	1, 286
Lampara nets				213
Otter trawls (including all types and sizes)				3, 865
Beam trawls			13	40
Paranzella nets				15
Gill nets	98, 012	101	3, 709	136, 153

[2] Includes persons in boat and shore fisheries.

[3] Includes dip nets, push nets, reef nets, cast nets, scap nets, and drag nets.

[5] Includes periwinkle, cockle, and fish pots; harpoons; spears; baskets; coquina scoops; and sponge hooks.

Fisheries of the United States and Alaska—Continued

OPERATING UNITS: BY SECTIONS—Continued

Item	Lakes, 1934	Mississippi River and tributaries, 1931	Alaska, 1934	Total for the various years
pparatus—Continued.	*Number*	*Number*	*Number*	*Number*
Trammel nets	123	518	------	1, 114
Pound nets, trap nets, and weirs	9, 008	374	479	15, 238
Stop nets	------	------	------	107
Fyke nets	2, 821	32, 541	------	43, 355
Bag nets and pocket nets	------	------	------	144
Other nets (3)	------	191	------	19, 699
Hooks, baits, or snoods	726, 986	2, 459, 179	(4)	11, 209, 717
Fish wheels	------	------	262	322
Eel pots and traps	------	------	------	26, 471
Brush traps	------	------	------	25, 250
Lobster pots	------	------	------	372, 556
Crab, shrimp, crawfish pots, traps, drags, etc	2, 710	456	2, 851	33, 872
Clam dredges	------	------	------	166
Crab dredges	------	------	------	286
Mussel dredges	------	440	------	443
Oyster dredges	------	------	------	1, 816
Scallop dredges and drags	------	------	------	2, 835
Crab scrapes	------	------	------	586
Tongs, rakes, hoes, forks, picks, grabs, etc	142	3, 994	------	28, 502
Diving outfits	16	------	------	88
Crowfoot bars	685	4, 480	------	5, 165
Other apparatus (5)	------	3, 781	------	11, 516

CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1934		South Atlantic and Gulf, 1934 [1]		Pacific, 1934	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
lewives	2, 817	17	1, 390	10	11, 080	96	15, 112	92	------	------
mberjack	2	(6)	------	------	------	------	4	(6)	------	------
nchovies	------	------	------	------	------	------	------	------	258	4
arracuda	------	------	------	------	------	------	------	------	2, 183	95
lack bass	------	------	------	------	33	3	424	25	------	------
luefish	921	76	3. 252	132	1, 265	55	3, 732	165	------	------
lue runner or hardtail	------	------	------	------	------	------	184	3	------	------
onito	52	2	247	14	20	1	------	------	------	------
owfin	------	------	------	------	------	------	1	(6)	------	------
uffalofish	------	------	------	------	------	------	19	1	------	------
utterfish	1, 554	68	4, 410	181	3, 791	121	44	1	------	------
abio or crab eater	------	------	------	------	25	1	7	(6)	------	------
abrilla	------	------	------	------	------	------	------	------	332	14
arp	------	------	390	36	460	24	109	4	264	5
atfish and bullheads	------	------	76	6	776	32	3, 480	117	185	23
ero	------	------	3	(6)	------	------	4	(6)	------	------
igarfish	------	------	------	------	------	------	4	(6)	------	------
od	99, 632	1, 856	7, 493	212	2	(6)	------	------	16, 440	221
orbina	------	------	------	------	------	------	------	------	1	(6)
rappie	------	------	------	------	1	(6)	462	12	------	------
revalle	2	(6)	7	(6)	------	------	115	2	------	------
roaker	2, 497	36	2, 048	48	22, 074	266	8, 374	118	------	------
unner	42	(6)	------	------	------	------	------	------	------	------
usk	6, 109	72	4	(6)	------	------	------	------	------	------
utlassfish	------	------	------	------	2	(6)	------	------	------	------
olphin	------	------	(6)	(6)	(6)	(6)	8	(6)	------	------
rum:										
Black	(6)	(6)	(6)	(6)	38	1	2, 556	69	------	------
Red or redfish	2	(6)	9	(6)	60	1	3, 365	156	------	------
els:										
Common	517	35	680	60	274	24	63	3	------	------
Conger	41	1	16	1	2	(6)	------	------	------	------
lounders	37, 795	1, 173	9, 252	363	1, 000	49	1, 297	63	12, 471	624
lyingfish	------	------	------	------	------	------	------	------	26	1
rigate mackerel	125	4	102	2	------	------	------	------	------	------

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[1] Includes the fisheries of Lake Okeechobee, Fla.

[3] Includes dip nets, push nets, reef nets, scap nets, and drag nets.

[4] Number not determined.

[5] Includes periwinkle, cockle, and fish pots; harpoons; spears; baskets; coquina scoops; and sponge hooks.

[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1934		South Atlantic and Gulf, 1934		Pacific, 1934	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Garfish							(6)	(6)		
Gizzard shad					114	1	24	(6)		
Goosefish			10	(6)						
Grayfish	13	(6)	7	(6)					526	12
Groupers							3, 570	85	61	3
Grunts							49	1		
Haddock	160, 107	3. 646	8, 507	248	(6)	(6)				
Hake	15, 320	203	162	3	21	(6)			57	1
Halibut	2, 457	236	53	7					24, 800	1, 780
Hardhead									147	7
Harvestfish or "starfish"					289	12	820	12		
Herring:										
Round			1	(6)						
Sea	48, 087	211	666	6	361	3			1, 081	6
Herring smelt	12	(6)								
Hickory shad	2	(6)	1	(6)	108	2	158	7		
Hogfish							6	(6)		
Horse mackerel									1, 581	15
Jewfish							47	1		
Kingfish (California)									634	15
Kingfish or "king mackerel"			(6)	(6)			2, 661	117		
King whiting or "kingfish"	40	1	157	15	106	5	661	16		
Lake trout										
Launce	21	(6)								
"Lingcod"									2, 092	67
Mackerel	40, 832	878	662	22	15	1	(6)	(6)	113. 848	720
Marlin									65	3
Menhaden	1, 029	3	79, 575	236	143, 879	600	164. 386	541		
Minnows					57	3				
Mojarro							19	(6)		
Mooneye										
Mullet	9	(6)	318	9	114	4	30, 485	812	19	1
Mummichog			51	4						
Muttonfish							199	9		
Paddlefish or "spoonbill cat"							1	(6)		
Permit							2	(6)		
Pigfish	4	(6)	(6)	(6)	9	(6)	187	3		
Pike or pickerel (jacks)			(6)	(6)	23	3	1	(6)		
Pilchard									1,135,959	4. 178
Pinfish							211	2		
Pollock	15, 027	164	777	12						
Pompano			(6)	(6)			442	79	4	2
Quillback										
Rock bass									412	21
Rockfishes									5, 228	184
Rosefish	264	3								
Rudderfish									32	1
Sablefish									4, 450	145
Salmon:										
Atlantic	25	6								
Blueback, red or sockeye									24, 297	1, 564
Chinook or king									33, 432	2, 346
Chum or keta									10, 696	222
Humpback or pink									191	6
Silver or coho									18, 476	814
Sauger										
Sawfish							18	(6)		
Sculpin									71	4
Scup or porgies	4, 195	89	6, 360	92	731	20	38	1		
Sea bass	3, 999	122	2, 475	87	137	5	256	10	859	38
Sea bass, white (California)									852	56
Sea catfish							105	(6)		
Sea robin	77	1	30	(6)	1	(6)				
Shad	386	16	834	76	4, 990	405	2, 497	330	1, 949	57
Sharks	66	1	12	(6)	20	(6)	3, 230	9		

[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1934		South Atlantic and Gulf, 1934		Pacific, 1934	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
FISH—continued										
Sheepshead:										
Fresh water										
Salt water	(6)	(6)	(6)	(6)			1, 199	39	144	
Silver perch					6	(6)				
Silversides			23	3						
Skates	240	2	84	1	10	(6)	175	(6)	232	3
Skipper or "billfish"	5	(6)								
Smelt	551	60	(6)	(6)					3, 867	84
Snapper:										
Mangrove							229	7		
Red							5, 856	323		
Snook							428	11		
Spadefish							6	(6)		
Spanish mackerel			6	(6)	53	4	6, 968	286	7	(6)
Splittail									55	1
Spot	33	(6)	528	8	2, 104	61	4, 905	76		
Squawfish									2	(6)
Squeteague or "sea trout":										
Gray	369	14	7, 874	227	14, 884	296	7, 742	181		
Spotted	2	(6)	(6)	(6)	57	3	8, 711	544		
White							731	18		
Squirrel hake			53	(6)						
Steelhead trout									2, 830	164
Striped bass	61	7	40	6	642	66	362	36	825	49
Sturgeon	8	1	30	3	8	1	73	6	80	2
Sturgeon, shovelnose										
Suckers	52	2	172	13	22	1			63	1
Sunfish			2	(6)	25	1	517	14		
Surffishes (perch)									263	14
Swellfish			2	(6)	2	(6)				
Swordfish	3, 381	405	103	13					264	37
Tautog	484	16	132	12	1	(6)				
Tenpounder							29	(6)		
Thimble-eyed mackerel	78	2	25	(6)	22	(6)				
Tilefish	207	10	1, 350	68						
Tomcod	2	(6)	8	(6)					1	(6)
Tripletail							1	(6)		
Tullibees										
Tuna and tunalike fishes:										
Albacore									121	9
Bluefin or horse mackerel	401	18	43	2			4	(6)	18, 358	846
Bonito									3, 203	77
Skipjack or striped									14, 830	594
Yellowfin									60, 913	3, 053
Turbot							2	(6)		
Wahoo							2	(6)		
White bass										
Whitebait			3	(6)					106	5
Whitefish:										
Common									93	5
Menominee										
White perch	50	7	75	5	734	34	540	23		
Whiting	9, 419	97	2, 147	21	4	(6)				
Wolffish	2, 197	32	26	1						
Yellow perch	1	(6)	8	1	166	10	17	(6)		
Yellow pike										
Yellowtail							81	5	2, 347	79
Miscellaneous fish									234	6
Total	461, 621	9, 593	142, 771	2, 266	210, 618	2, 215	288, 015	4, 435	1,522,817	18, 289
SHELLFISH, ETC.										
Crabs:										
Hard	5, 629	40	955	25	36, 137	739	18, 013	266	7, 004	462
King	7	(6)	2, 750	7			500	(6)		
Soft			94	20	3, 660	311	908	123		
Stone							81	6		
Crawfish									144	15

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[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1934		South Atlantic and Gulf, 1934		Pacific, 1934	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
SHELLFISH—continued										
Lobsters:										
Common	9,088	1,608	724	137	(6)	(6)				
Spiny							351	17	1,183	180
Shrimp	41	2	86	15			119,318	3,069	1,844	32
Abalone									645	105
Clams:										
Coquina							6	1		
Hard	3,040	375	3,621	532	2,641	367	920	66	712	42
Pismo									35	7
Razor	358	16							586	84
Soft	9,431	476	1,136	65					71	16
Surf	59	4	526	24						
Mixed									38	2
Conchs			35	2			2	(6)		
Mussels, sea	141	6	53	3	23	1				
Mussel shells										
Octopus							2	(6)	96	4
Oysters:										
Eastern, market, public	87	12	178	20	22,588	1,347	12,170	731		
Eastern, market, private	5,070	735	13,754	1,428	13,198	956	6,657	410	90	39
Japanese, market									4,956	359
Western, market									330	187
Periwinkles and "cockles"	191	12								
Scallops:										
Bay	621	204	49	17			110	12	12	3
Sea	2,158	267	2,197	216	1	1	120	18		
Squid	1,075	19	792	15	114	4			1,537	32
Sea urchins	6	(6)								
Terrapin			1	1	26	2	17	2		
Turtles			11	1	5	(6)	69	1	4	(6)
Frogs										
Irish moss	12	1								
Sponges							655	837		
Pearls and slugs										
Bloodworms	661	71	11	10						
Sandworms	640	45	9	7						
Total	38,315	3,893	26,982	2,545	78,393	3,728	159,899	5,559	19,287	1,569
WHALE PRODUCTS [7]										
Meat									2,044	41
Fertilizer										
Oil, sperm										
Oil, whale									1,954	51
Total									3,998	92
Grand total	499,936	13,486	169,753	4,811	289,011	5,943	447,914	9,994	1,546,102	19,950

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1934		Total for the various years	
FISH	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alewives							30,399	215
Amberjack							6	(6)
Anchovies							258	4
Barracuda							2,183	95
Black bass			14	2			471	30
Bluefish							9,170	428
Blue pike	8,509	445					8,509	445
Blue runner or hardtail							184	3
Bonito							319	17
Bowfin	9	(6)	428	9			438	9
Buffalofish	1	(6)	15,772	688			15,792	689

[6] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1934		Total for the various years	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Butterfish							9, 799	371
Burbot	396	7					396	7
Cabio or crab eater							32	1
Cabrilla							332	14
Carp	3, 846	66	11, 892	456			16, 961	591
Catfish and bullheads	789	48	10, 267	878			15, 573	1, 104
Cero							7	(6)
Chubs	7, 149	644					7, 149	644
Cigarfish							4	(6)
Cisco	111	9					111	9
Cod					1, 487	9	125, 054	2, 298
Corbina							1	(6)
Crappie	1	(6)	41	3			505	15
Crevalle							124	2
Croaker							34, 993	468
Cunner							42	(6)
Cusk							6, 113	72
Cutlassfish							2	(6)
Dolly Varden trout					41	3	41	3
Dolphin							8	(6)
Drum:								
Black							2, 594	70
Red or redfish							3, 436	157
Eels:								
Common	65	2	7	(6)			1, 606	124
Conger							59	2
Flounders					300	4	62, 115	2, 276
Flyingfish							26	1
Frigate mackerel							227	6
Garfish			73	1			73	1
Gizzard shad							138	1
Goldfish	68	1					68	1
Goosefish							10	(6)
Grayfish							546	12
Groupers							3, 631	88
Grunts							49	1
Haddock							168, 614	3, 894
Hake							15, 560	207
Halibut					14, 690	805	42, 000	2, 828
Hardhead							147	7
Harvestfish or "starfish"							1, 109	24
Herring:								
Round							1	(6)
Lake	23, 941	440					23, 941	440
Sea					165, 637	828	215, 832	1, 054
Herring smelt							12	(6)
Hickory shad							269	9
Hogfish							6	(6)
Horse mackerel							1, 581	15
Jewfish							47	1
Kingfish (California)							634	15
Kingfish or "king mackerel"							2, 661	117
King whiting or "kingfish"							964	37
Lake trout	10, 112	1, 200					10, 112	1, 200
Launce							21	(6)
"Lingcod"							2, 092	67
Mackerel							155, 357	1, 621
Marlin							65	3
Menhaden							388, 869	1, 380
Minnows			1	(6)			58	3
Mojarro							19	(6)
Mooneye	26	(6)	3	(6)			29	(6)
Mullet							30, 945	826
Mummichog							51	4
Muttonfish							199	9
Paddlefish or "spoonbill cat"			951	43			952	43
Permit							2	(6)
Pigfish							200	3
Pike or pickerel (jacks)	559	19	5	(6)			588	22
Pilchard							1, 135, 959	4, 178
Pinfish							211	2
Pollock							15, 804	176
Pompano							446	81
Quillback			268	11			268	11

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[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1934		Total for the various years	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Rock bass	23	1					435	22
Rockfishes					7	(6)	5, 235	184
Rosefish							264	3
Rudderfish							32	1
Sablefish					317	9	4, 767	154
Salmon:								
Atlantic							25	6
Blueback, red or sockeye					225, 457	4, 510	249, 754	6, 074
Chinook or king					11, 193	270	44, 625	2, 616
Chum or keta					73, 136	706	83, 832	928
Humpback or pink					292, 153	4, 002	292, 344	4, 008
Silver or coho					22, 712	393	41, 188	1, 207
Sauger	1, 174	58	3	(6)			1, 177	58
Sawfish							18	(6)
Sculpin							71	4
Scup or porgies							11, 324	202
Sea bass							7, 726	262
Sea bass, white (California)							852	56
Sea catfish							105	(6)
Sea robin							108	1
Shad							10, 656	884
Sharks							3, 328	10
Sheepshead:								
Fresh water	2, 232	38	3, 905	143			6, 137	181
Salt water							1, 343	44
Silver perch							6	(6)
Silversides							23	3
Skates							741	6
Skipper or "billfish"							5	(6)
Smelt	1, 029	16					5, 447	160
Snapper:								
Mangrove							229	7
Red							5, 856	323
Snook							428	11
Spadefish							6	(6)
Spanish mackerel							7, 034	290
Splittail							55	1
Spot							7, 570	145
Squawfish							2	(6)
Squeteague or "sea trout":								
Gray							30, 869	718
Spotted							8, 770	547
White							731	18
Squirrel hake							53	(6)
Steelhead trout	2	(6)			53	2	2, 885	166
Striped bass							1, 930	164
Sturgeon	36	9					235	22
Sturgeon, shovelnose			87	8			87	8
Suckers	5, 616	136	315	13			6, 240	166
Sunfish	18	(6)	22	1			584	16
Surffishes (perch)							263	14
Swellfish							4	(6)
Swordfish							3, 748	455
Tautog							617	28
Tenpounder							29	(6)
Thimble-eyed mackerel							125	2
Tilefish							1, 557	78
Tomcod							11	(6)
Tripletail							1	(6)
Tullibees	156	(6)					156	(6)
Tuna and tunalike fishes:								
Albacore							121	9
Bluefin or horse mackerel							18, 806	866
Bonito							3, 203	77
Skipjack or striped							14, 830	594
Yellowfin							60, 913	3, 053
Turbot							2	(6)
Wahoo							2	(6)
White bass	688	25	3	(6)			691	25
Whitebait							109	5
Whitefish:								
Common	6, 276	804					6, 369	809
Menominee	229	12					229	12

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[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1934		Total for the various years	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
White perch							1,399	69
Whiting							11,570	118
Wolffish							2,223	33
Yellow perch	16,099	695					16,291	706
Yellow pike	4,081	393	5	1			4,086	394
Yellowtail							2,428	84
Miscellaneous fish							234	6
Total	93,241	5,068	44,062	2,257	807,183	11,541	3,570,328	55,664
SHELLFISH, ETC.								
Crabs:								
Hard					1,259	104	68,997	1,636
King							3,257	7
Soft							4,662	454
Stone							81	6
Crawfish	36	3	28	(6)			208	18
Lobsters:								
Common							9,812	1,745
Spiny							1,534	197
Shrimp			49	4	690	24	122,028	3,146
Abalone							645	105
Clams:								
Coquina							6	1
Hard					2	(6)	10,936	1,382
Pismo							35	7
Razor					781	38	1,725	138
Soft							10,638	557
Surf							585	28
Mixed							38	2
Conchs							37	2
Mussels, sea							217	10
Mussel shells	3,134	51	37,255	422			40,389	473
Octopus							98	4
Oysters:								
Eastern, market, public							35,023	2,110
Eastern, market, private							38,769	3,568
Japanese, market							4,956	359
Western, market							330	187
Periwinkles and "cockles"							191	12
Scallops:								
Bay							792	236
Sea							4,476	502
Squid							3,518	70
Sea urchins							6	(6)
Terrapin			19	(6)			63	5
Turtles			95	3			184	5
Frogs			875	131			875	131
Irish moss							12	1
Sponges							655	837
Pearls and slugs		2		80				82
Bloodworms							672	81
Sandworms							649	52
Total	3,170	56	38,321	640	2,732	166	367,099	18,156
WHALE PRODUCTS [7]								
Meat							2,044	41
Fertilizer					2,698	38	2,698	38
Oil, sperm					574	17	574	17
Oil, whale					6,082	196	8,036	247
Total					9,354	251	13,352	343
Grand total	96,411	5,124	82,383	2,897	819,269	11,958	3,950,779	74,163

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[6] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

Fisheries of the United States and Alaska—Continued

CATCH: BY STATES [8]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

State	Marine and coastal rivers		Mississippi River and tributaries		Lakes [9]		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alabama	7, 964	253	1, 822	33	--------	--------	9, 786	286
Arkansas	--------	--------	15, 733	411	--------	--------	15, 733	411
California	1, 406, 176	12, 188	--------	--------	--------	--------	1, 406, 176	12, 188
Connecticut	9, 878	613	--------	--------	--------	--------	9, 878	613
Delaware	36, 527	209	--------	--------	--------	--------	36, 527	209
Florida	117, 192	3, 587	--------	--------	1, 609	48	118, 801	3, 635
Georgia	27, 141	360	--------	--------	--------	--------	27, 141	360
Illinois	--------	--------	14, 263	367	1, 206	92	15, 469	459
Indiana	--------	--------	7, 717	157	702	52	8, 419	209
Iowa	--------	--------	7, 778	302	--------	--------	7, 778	302
Kansas	--------	--------	455	17	--------	--------	455	17
Kentucky	--------	--------	1, 622	61	--------	--------	1, 622	61
Louisiana	76, 633	2, 285	19, 214	995	--------	--------	95, 847	3, 280
Maine	98, 498	2, 307	--------	--------	--------	--------	98, 498	2, 307
Maryland	42, 210	1, 766	--------	--------	--------	--------	42, 210	1, 766
Massachusetts	373, 670	9, 507	--------	--------	--------	--------	373, 670	9, 507
Michigan	--------	--------	--------	--------	30, 393	2, 156	30, 393	2, 156
Minnesota	--------	--------	3, 498	138	10, 735	297	14, 233	435
Mississippi	22, 153	652	2, 650	123	--------	--------	24, 803	775
Missouri	--------	--------	928	77	--------	--------	928	77
Nebraska	--------	--------	145	16	--------	--------	145	16
New Hampshire	523	57	--------	--------	--------	--------	523	57
New Jersey	93, 263	2, 146	--------	--------	--------	--------	93, 263	2, 146
New York	39, 911	2, 453	--------	--------	1, 432	99	41, 343	2, 552
North Carolina	163, 462	1, 672	--------	--------	--------	--------	163, 462	1, 672
Ohio	--------	--------	185	7	27, 670	1, 157	27, 855	1, 164
Oklahoma	--------	--------	40	4	--------	--------	40	4
Oregon	26, 458	1, 457	--------	--------	--------	--------	26, 458	1, 457
Pennsylvania	52	3	--------	--------	3, 572	208	3, 624	211
Rhode Island	17, 366	1, 001	--------	--------	--------	--------	17, 366	1, 001
South Carolina	5, 891	225	--------	--------	--------	--------	5, 891	225
South Dakota	--------	--------	114	11	--------	--------	114	11
Tennessee	--------	--------	3, 435	104	--------	--------	3, 435	104
Texas	25, 869	912	139	6	--------	--------	26, 008	918
Virginia	246, 801	4, 177	--------	--------	--------	--------	246, 801	4, 177
Washington	113, 469	6, 305	--------	--------	--------	--------	113, 469	6, 305
Wisconsin	--------	--------	2, 645	68	20, 701	1, 064	23, 346	1, 132
Alaska	819, 269	11, 958	--------	--------	--------	--------	819, 269	11, 958
Total	3, 770, 376	66, 093	82, 383	2, 897	98, 020	5, 173	3, 950, 779	74, 163

SEED OYSTER FISHERY

Item	New England, 1933	Middle Atlantic, 1933
OPERATING UNITS		
Fishermen:	*Number*	*Number*
On vessels	93	1, 586
On boats and shore:		
Regular	5	298
Casual	160	150
Total	258	2, 034
Vessels:		
Steam	3	--------
Net tonnage	245	--------
Motor	18	7
Net tonnage	271	69
Sail	2	146
Net tonnage	17	2, 977
Total vessels	23	153
Total net tonnage	533	3, 046

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[8] The catch for "Marine and coastal rivers" and "Lakes" is for 1934 except in the New England and Middle Atlantic States, which is for 1933. The catch for "Mississippi River and tributaries" is for 1931.

[9] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee and several mussel-bearing streams tributary to Lakes Huron, Erie, and Michigan.

Fisheries of the United States and Alaska—Continued

SEED OYSTER FISHERY—Continued

Item	New England, 1933		Middle Atlantic, 1933	
OPERATING UNITS—continued	*Number*		*Number*	
Boats:				
Motor	7		206	
Other	90		152	
Apparatus:				
Dredges, oyster	101		300	
Yards at mouth	97		363	
Tongs	96		374	
Rakes	46		79	
CATCH	*Bushels*	*Value*	*Bushels*	*Value*
Oysters:				
Seed, public, spring	31, 458	$12, 684	1, 003, 540	$261, 862
Seed, public, fall	43, 163	17, 265	23, 500	8, 250
Seed, private, spring	207, 185	69, 617	40, 290	39, 540
Seed, private, fall	----	----	38, 290	38, 290
Total	281, 806	99, 566	1, 105, 620	347, 942

Item	Chesapeake, 1934		South Atlantic and Gulf, 1934		Total	
OPERATING UNITS	*Number*		*Number*		*Number*	
Fishermen:						
On vessels	28		----		1, 707	
On boats and shore:						
Regular	1, 005		12		1, 320	
Casual	120		----		430	
Total	1, 153		12		3, 457	
Vessels:						
Steam	7		----		10	
Net tonnage	69		----		314	
Motor	1		----		26	
Net tonnage	23		----		363	
Sail	----		----		148	
Net tonnage	----		----		2, 994	
Total vessels	8		----		184	
Total net tonnage	92		----		3, 671	
Boats:						
Motor	558		----		771	
Other	36		6		284	
Apparatus:						
Dredges, oyster	10		12		423	
Yards at mouth	19		12		491	
Tongs	1, 131		----		1, 601	
Rakes	----		----		125	
CATCH	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Oysters:						
Seed, public, spring	1, 156, 083	$174, 024	17, 450	$2, 617	2, 208, 531	$451, 187
Seed, public, fall	867, 342	130, 708	----	----	934, 005	156, 223
Seed, private, spring	32, 868	1, 643	----	----	280, 343	110, 800
Seed, private, fall	32, 868	1, 644	----	----	71, 158	39, 934
Total	2, 089, 161	308, 019	17, 450	2, 617	3, 494, 037	758, 144

NOTE.—Of the number of persons fishing for seed oysters, a total of 3,033 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 93 vessels, 540 motor boats, 212 other boats, 192 dredges, 1,396 tongs, and 61 rakes.

Yield of the fisheries of the United States: By gear

Gear	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	56, 586, 422	$796, 362	77, 945, 874	$205, 503	143, 009, 600	$596, 380
Haul seines	910, 017	32, 041	1, 845, 557	70, 568	4, 536, 400	158, 231
Gill nets	18, 593, 520	359, 016	2, 517, 827	117, 750	1, 378, 000	114, 672
Lines	99, 382, 952	2, 167, 473	7, 633, 174	292, 745	29, 941, 200	552, 436
Pound nets	14, 419, 422	227, 622	28, 325, 529	692, 557	56, 095, 000	1, 197, 115
Floating traps	8, 458, 029	159, 754	-----	-----	-----	-----
Other traps	28, 910	2, 512	-----	-----	-----	-----
Weirs	21, 801, 005	92, 599	893, 336	2, 485	-----	-----
Stop nets	-----	-----	208, 874	20, 472	22, 100	448
Fyke nets	81, 216	3, 192	694, 092	21, 736	1, 098, 200	50, 846
Dip nets	3, 640, 232	45, 571	86, 022	16, 852	2, 778, 300	231, 038
Cast nets	-----	-----	400	48	-----	-----
Scap nets	-----	-----	149, 664	8, 574	-----	-----
Bag and pocket nets	116, 068	13, 039	-----	-----	-----	-----
Drag nets	-----	-----	51, 900	10, 855	-----	-----
Push nets	18, 000	7, 000	-----	-----	-----	-----
Otter trawls	235, 003, 844	5, 296, 742	24, 410, 956	780, 076	4, 567, 200	113, 071
Pots	15, 081, 503	1, 673, 370	[2] 2, 369, 400	[2] 203, 269	166, 600	11, 828
Harpoons	3, 481, 594	406, 727	102, 386	12, 549	-----	-----
Spears	106, 663	7, 537	126, 568	12, 682	1, 800	180
Scrapes, crab	-----	-----	-----	-----	1, 342, 100	71, 682
Dredges	8, 311, 071	1, 224, 218	17, 238, 166	1, 698, 835	15, 069, 200	820, 679
Tongs	1, 443, 961	202, 993	2, 618, 049	372, 867	27, 646, 300	1, 795, 459
Rakes	1, 129, 890	145, 761	1, 281, 227	179, 516	374, 600	30, 198
Forks	2, 811, 825	283, 046	171, 093	29, 770	-----	-----
Hoes	8, 378, 980	333, 750	913, 560	45, 752	-----	-----
Picks	-----	-----	-----	-----	269, 400	40, 416
Gaffs	-----	-----	750	75	-----	-----
By hand	151, 015	5, 225	169, 331	15, 519	714, 900	158, 731
Total	499, 936, 139	13, 485, 550	169, 753, 735	4, 811, 055	289, 010, 900	5, 943, 410

Gear	South Atlantic and Gulf, 1934		Pacific, 1934		Lakes, 1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	164, 367, 700	$553, 133	906, 342, 200	$5, 390, 907	-----	-----
Haul seines	36, 138, 600	990, 725	6, 022, 900	339, 077	4, 176, 000	$89, 287
Gill nets	48, 900, 500	1, 598, 648	27, 358, 500	1, 409, 810	44, 432, 900	2, 547, 455
Trammel nets	5, 655, 000	290, 441	848, 000	64, 130	218, 500	4, 051
Lines	32, 049, 700	978, 492	159, 150, 300	7, 226, 138	2, 394, 600	278, 599
Pound nets	19, 218, 900	304, 045	21, 517, 500	1, 276, 083	10, 902, 100	494, 978
Other traps	520, 100	65, 700	-----	-----	28, 686, 600	1, 546, 336
Weirs	3, 000	90	236, 400	1, 466	-----	-----
Wheels	450, 000	2, 500	320, 500	23, 545	-----	-----
Stop nets	563, 400	16, 674	-----	-----	-----	-----
Fyke nets	146, 600	4, 516	247, 700	21, 617	2, 430, 500	106, 628
Dip nets	3, 745, 200	109, 531	2, 673, 300	48, 504	-----	-----
Drag bag nets	-----	-----	1, 521, 000	28, 155	-----	-----
Cast nets	642, 200	14, 240	-----	-----	-----	-----
Push nets	[1] 5, 800	[1] 975	-----	-----	-----	-----
Reef nets	-----	-----	23, 800	1, 120	-----	-----
Lampara nets	-----	-----	385, 368, 400	1, 855, 358	-----	-----
Paranzella nets	-----	-----	12, 505, 800	581, 830	-----	-----
Otter trawls	113, 248, 200	2, 914, 053	1, 363, 500	43, 364	-----	-----
Beam trawls	-----	-----	522, 000	14, 459	-----	-----
Pots	1, 426, 500	61, 204	8, 293, 100	652, 317	35, 600	3, 200
Harpoons	-----	-----	4, 323, 200	131, 338	-----	-----
Spears	153, 800	10, 213	-----	-----	-----	-----
Dredges	8, 148, 000	545, 011	(3)	(3)	-----	-----
Tongs	7, 636, 200	508, 060	[3] 6, 819, 200	[3] 736, 099	-----	-----
Crowfoot bars	-----	-----	-----	-----	1, 681, 800	29, 125
Rakes	367, 100	38, 772	(3)	(3)	-----	-----
Forks	134, 200	5, 988	-----	-----	-----	-----
Grabs	2, 991, 100	103, 656	-----	-----	-----	-----
Picks	-----	-----	-----	-----	251, 300	4, 723
Hooks	240, 400	250, 269	-----	-----	-----	-----
Diving apparatus, abalone and sponge	417, 400	587, 456	644, 700	104, 742	35, 200	679
By hand	744, 300	39, 268	-----	-----	1, 166, 100	18, 674
Total	447, 913, 900	9, 993, 660	1, 546, 102, 000	19, 950, 059	96, 411, 200	5, 123, 735

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[1] This catch was made by scoop nets.

[2] Includes the catch by baskets.

[3] The catch by shovels, rakes, and dredges is included with tongs.

Yield of the fisheries of the United States: By gear—Continued

Gear	Mississippi River and tributraries, 1931		Total	
	Pounds	*Value*	*Pounds*	*Value*
Purse seines			1,348,251,796	$7,542,285
Haul seines	13,739,657	$574,541	67,369,131	2,254,470
Gill nets	166,598	6,547	143,347,845	6,153,898
Trammel nets	1,134,206	75,615	7,855,706	434,237
Lines	10,140,037	772,245	340,691,963	12,268,128
Pound nets	224,275	9,541	150,702,726	4,201,941
Floating traps			8,458,029	159,754
Other traps			29,235,610	1,614,548
Weirs			22,933,741	96,640
Wheels			770,500	26,045
Stop nets			794,374	37,594
Fyke nets	18,507,204	797,130	23,205,512	1,005,665
Dip nets	30,045	3,307	12,953,099	454,803
Drag bag nets			1,521,000	28,155
Cast nets			642,600	14,288
Scap nets			149,664	8,574
Bag and pocket nets			116,068	13,039
Drag nets			51,900	10,855
Push nets			23,800	7,975
Reef nets			23,800	1,120
Lampara nets			385,368,400	1,855,358
Paranzella nets			12,505,800	581,830
Otter trawls			378,593,700	9,147,306
Beam trawls			522,000	14,459
Pots	[2] 310,455	[2] 26,277	27,683,158	2,631,465
Harpoons			7,907,180	550,614
Spears	2,250	270	391,081	30,882
Scrapes, crab			1,342,100	71,682
Dredges	3,699,100	40,958	52,465,537	4,329,701
Tongs	1,601,876	21,091	47,765,586	3,636,569
Crowfoot bars	20,893,550	265,443	22,575,350	294,568
Rakes	370,130	4,029	3,522,947	398,276
Forks	4,812,737	76,214	7,929,855	395,018
Hoes			9,292,540	379,502
Grabs	873,099	130,621	3,864,199	234,277
Picks			520,700	45,139
Hooks			240,400	250,269
Diving apparatus, abalone and sponge			1,097,300	692,877
Gaffs			750	75
By hand	5,877,304	93,528	8,822,950	330,945
Total	82,382,523	2,897,357	3,131,510,397	62,204,826

[2] Includes catch by baskets.

Industries related to the fisheries of the United States and Alaska

Item	New England, 1933	Middle Atlantic, 1933	Chesapeake, 1934	South Atlantic and Gulf, 1934
Transporting:				
Persons engaged:	*Number*	*Number*	*Number*	*Number*
On vessels	256	110	971	397
On boats	54	92	137	181
Total	310	202	1,108	578
Vessels:				
Steam	1		1	
Net tonnage	67		103	
Motor	104	30	433	157
Net tonnage	1,615	629	5,336	1,631
Sail			15	33
Net tonnage			387	301
Total vessels	105	30	449	190
Total net tonnage	1,682	629	5,826	1,932
Boats	31	87	111	168
Wholesale and manufacturing:				
Establishments	362	398	544	591
Persons engaged:				
Proprietors	266	358	689	637
Salaried employees	799	1,067	363	409
Wage earners:				
Average for season	8,112	4,206	11,465	13,308
Average for year	4,170	2,948	5,054	4,200
Salaries and wages paid	$5,410,072	$6,085,981	$2,758,749	$2,873,812
Manufactured products [4]	[5] $17,604,594	[5] $10,998,508	$7,826,195	$9,906,595
Fishermen's manufactured products:				
Persons engaged	2,223	512	134	987
Products [4]	$553,235	$260,146	$11,228	$129,700

[4] Includes packaged, cured, and canned fishery products and byproducts.
[5] Includes data for 1934 on packaged and canned products and byproducts.

Industries related to the fisheries of the United States and Alaska—Continued

Item	Pacific, 1934	Lakes, 1934	Mississippi River and tributaries, 1931	Alaska, 1934	Total for the various years
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	263	15	29	1,758	3,799
On boats				(1)	464
Total	263	15	29	1,758	4,263
Vessels:					
Steam	1			11	14
Net tonnage	32			19,967	20,169
Motor	111	8	8	367	1,218
Net tonnage	2,430	114	104	14,060	25,919
Sail					48
Net tonnage					688
Total vessels	112	8	8	378	1,280
Total net tonnage	2,462	114	104	34,027	46,776
Boats				[2] 708	1,105
Wholesale and manufacturing:					
Establishments	323	238	217	231	2,904
Persons engaged:					
Proprietors	358	173	204	14,999	77,599
Salaried employees	816	521	355		
Wage earners:					
Average for season	12,046	2,173	4,275		
Average for year	5,059	1,152	3,483	(3)	(3)
Salaries and wages paid	$7,031,444	$2,442,879	$3,080,430	(3)	(3)
Manufactured products [4]	$41,007,888	$2,696,035	[5] $3,318,829	$40,681,925	$134,040,569
Fishermen's manufactured products:					
Persons engaged	195	535	216	(3)	(3)
Products [4]	$235,549	$67,850	$8,751	(3)	(3)

[1] Included in vessels.
[2] Includes scows, houseboats, pile drivers, etc.
[3] Statistics not available.
[4] Includes packaged, cured, and canned fishery products and by products.
[5] Includes data for 1934 on packaged and canned products and byproducts.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products, 4,061 have also been included as fishermen, and 872 of the persons shown on transporting craft have also been included as fishermen.

MANUFACTURED FISHERY PRODUCTS

Statistics of the output of the various manufactured fishery products have been collected in considerably more detail for 1930, 1931, 1933, and 1934 than in previous years. In addition to statistics of the production of cured fishery products, canned fishery products, and fishery byproducts, data also have been collected on the output of packaged fishery products, including shucked oysters, fresh-cooked crab meat, and similar commodities, in the more recent surveys.

Since only a part of the United States was surveyed for general fishery statistics for 1934, the following compilation of manufactured fishery products consists of composite data based on the most recent statistics. The years covered by the data are indicated by footnotes.

Manufactured fishery products of the United States and Alaska [1]

Item	Quantity	Value
Alewives:		
Salted:		
Corned [2] pounds	6,523,375	$77,004
Tight-pack cut [2] do	1,694,538	35,392
Tight-pack roe do	106,900	5,275
Pickled do	[3] 2,395,390	108,005
Spiced do	383,500	54,925
Smoked [2] do	246,435	8,175
Canned standard cases	18,499	54,044
Roe, canned do	19,132	83,331
Dry scrap tons	520	16,508
Oil gallons	13,250	1,505

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Barracuda, fresh fillets……pounds	560,000	$67,200
Bluefish, smoked [4]……do	250	46
Buffalofish, smoked [5]……do	470,700	136,295
Butterfish, smoked [5]……do	615,824	150,065
Cabrilla, fresh fillets……do	120,000	14,650
Carp, smoked [5]……do	215,922	65,476
Cisco, chubs, tullibee, and lake herring, smoked [4]……do	7,829,264	1,642,384
Cod:		
Fresh fillets……do	9,044,817	1,080,506
Frozen fillets……do	5,902,503	565,016
Fresh steaks and sticks……do	291,453	31,861
Salted:		
Green [2]……do	[3] 6,944,569	293,899
Green in process, partly boned……do	2,255,775	155,966
Dry [2]……do	1,177,449	63,579
Boneless, including absolutely boneless [2]……do	8,992,565	1,636,843
Tongues……do	2,600	130
Stockfish……do	23,400	2,403
Smoked fillets [4]……do	1,128,228	167,659
Oil:		
Cod……gallons	51,132	22,149
Cod liver……do	94,312	56,643
Croaker, fresh fillets……pounds	38,500	3,780
Croaker, fresh, pandressed……do	563,000	30,360
Cusk:		
Fresh fillets……do	425,033	54,847
Frozen fillets……do	86,097	5,824
Fresh steaks……do	327,546	36,219
Salted:		
Green [4]……do	[3] 61,650	1,288
Dry [4]……do	33,972	1,593
Boneless, including absolutely boneless [4]……do	28,835	3,469
Smoked fillets [3]……do	195,803	25,334
Eels:		
Smoked [5]……do	101,000	27,140
Pickled and salted [2]……do	102,200	6,936
Flounders:		
Fresh fillets……do	4,189,900	657,621
Frozen fillets……do	458,430	64,145
Grayfish, fresh fillets……do	130,000	13,000
Groupers, fresh steaks and fillets……do	385,561	56,428
Haddock:		
Fresh fillets……do	17,378,226	2,047,664
Frozen fillets……do	19,226,422	1,742,139
Fresh sticks……do	61,422	11,206
Salted:		
Green [4]……do	[3] 45,765	1,091
Dry [4]……do	52,032	2,550
Boneless, including absolutely boneless [4]……do	98,295	19,220
Smoked fillets [4]……do	149,214	26,928
Finnan haddie [4]……do	1,171,354	134,818
Hake:		
Fresh fillets……do	1,192,794	120,116
Frozen fillets……do	164,449	12,159
Fresh sticks……do	326,726	36,244
Salted:		
Green [4]……do	[3] 408,653	11,195
Dry [4]……do	277,670	8,896
Boneless, including absolutely boneless [4]……do	581,201	47,851
Smoked fillets [4]……do	33,282	4,586
Halibut:		
Fresh fillets and steaks……do	95,679	23,204
Frozen steaks……do	146,124	22,843
Herring, lake:		
Fresh fillets……do	144,935	13,344
Salted……do	5,599,920	193,975
Herring, sea:		
Salted [2]……do	100,900	3,297
Roused……do	513,050	16,854
Spiced [2]……do	436,816	39,289
Pickled [2]……do	540,100	11,055
Scotch cure……do	7,409,200	445,476
Norwegian cure……do	230,540	8,298
Dry salted……do	80,400	2,701
Smoked:		
Bloaters, hard [2]……do	961,142	45,887
Bloaters, soft [4]……do	886,994	64,636
Bloaters, unclassified……do	72,550	5,804
Boneless [4]……do	1,953,365	187,020
Lengthwise [4]……do	114,915	9,456
Medium scale [4]……do	171,870	14,597
Kippered [2]……do	238,355	29,093
Miscellaneous……do	53,000	4,770

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Herring, sea—Continued.		
Canned "sardines".....standard cases	1, 142, 730	$3, 315, 190
Pearl essence.....pounds	13, 805	103, 475
Dry scrap.....tons	1, 297	38, 122
Meal.....do	15, 179	476, 958
Oil.....gallons	3, 772, 099	641, 839
Lake trout:		
Fresh fillets.....pounds	11, 865	2, 529
Smoked.....do	545, 398	131, 286
Salted.....do	25, 000	1, 240
"Lingcod", fresh fillets.....do	147, 500	17, 340
Mackerel:		
Fresh fillets.....do	80, 200	9, 854
Frozen fillets.....do	213, 177	18, 327
Salted:		
Fillets [4].....do	1, 767, 946	133, 266
Split [4].....do	1, 396, 180	95, 396
Miscellaneous.....do	700	49
Smoked [2].....do	176, 690	28, 477
Canned.....standard cases	1, 275, 419	3, 244, 944
Meal.....tons	3, 323	98, 392
Oil.....gallons	157, 571	25, 533
Menhaden:		
Acid scrap.....tons	22, 051	381, 559
Dry scrap.....do	32, 450	1, 040, 745
Meal.....do	5, 485	206, 952
Oil.....gallons	3, 612, 364	705, 657
Mullet:		
Salted.....pounds	880, 100	41, 209
Smoked.....do	4, 500	1, 175
Roe, salted.....do	153, 930	9, 291
Paddlefish:		
Smoked [6].....do	363, 800	163, 260
Roe, salted [7].....do	1, 595	812
Pike, blue, yellow, and sauger:		
Fresh fillets.....do	2, 147, 059	417, 891
Frozen fillets.....do	540, 064	100, 360
Pilchard:		
Canned "sardines".....standard cases	1, 970, 047	5, 481, 391
Meal.....tons	89, 280	2, 878, 269
Oil.....gallons	20, 845, 171	4, 413, 609
Pollock:		
Fresh fillets and steaks.....pounds	1, 344, 375	110, 486
Frozen fillets.....do	3, 051, 405	189, 941
Salted:		
Green [4].....do	[3] 114, 145	2, 275
Dry [4].....do	983, 829	39, 119
Rockfishes, fresh fillets.....do	934, 500	119, 870
Rosefish, fresh fillets.....do	17, 760	2, 191
Sablefish:		
Fresh fillets.....do	459, 000	45, 900
Salted.....do	291, 006	17, 037
Kippered [8].....do	631, 282	96, 971
Smoked.....do	30, 142	7, 220
Salmon:		
Fresh fillets and steaks.....do	45, 095	11, 224
Frozen fillets and steaks.....do	32, 103	5, 048
Salted:		
Pickled in brine.....do	396, 665	29, 774
Mild cured.....do	[3] 9, 828, 952	1, 841, 481
Caviar.....do	158, 078	20, 141
Miscellaneous.....do	1, 439, 650	58, 094
Smoked [5].....do	8, 321, 240	2, 347, 532
Kippered [2].....do	2, 377, 887	468, 737
Canned:		
Chinook or king.....standard cases	324, 807	3, 171, 601
Blueback, red or sockeye.....do	2, 988, 327	21, 359, 600
Silver or coho.....do	371, 683	2, 303, 514
Humpback or pink.....do	3, 826, 823	15, 680, 145
Chum or keta.....do	855, 314	3, 149, 341
Steelhead trout.....do	16, 082	153, 696
Meal.....tons	1, 737	46, 468
Oil.....gallons	202, 458	57, 306
Eggs for food, canned.....standard cases	860	20, 164
Eggs for bait, canned.....do	5, 044	128, 453
Sea bass:		
Black, fresh fillets.....pounds	485, 000	54, 000
White, fresh fillets.....do	168, 500	26, 565
Shad:		
Mild cured.....do	52, 800	3, 200
Smoked and kippered [2].....do	247, 142	48, 578
Canned.....standard cases	8, 233	24, 458
Roe canned.....do	2, 118	58, 857

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Sheepshead:		
Fresh fillets.....pounds	47, 845	$6, 643
Frozen fillets.....do	1, 348	135
Smoked [7].....do	617	77
Snapper, red:		
Fresh fillets and steaks.....do	65, 335	13, 274
Squeteagues:		
Fresh fillets.....do	115, 300	10, 446
Fresh pandressed.....do	965, 000	54, 350
Squirrel hake, smoked [4].....do	50	5
Sturgeon:		
Smoked and kippered [5].....do	1, 523, 602	780, 944
Salted roe [5].....do	402	338
Caviar, canned.....standard cases	3, 128	397, 036
Swordfish, fresh fillets and steaks.....pounds	110, 289	32, 465
Totuava, fresh fillets.....do	365, 000	54, 750
Trout (Dolly Varden), dried.....do	1, 500	30
Tuna and tunalike fishes:		
Canned:		
Albacore.....standard cases	90, 599	512, 319
Bluefin.....do	312, 198	1, 420, 733
Bonito.....do	58, 083	234, 598
Striped.....do	226, 359	1, 034, 799
"Tonno".....do	167, 484	1, 082, 318
Yellowfin.....do	1, 100, 772	5, 680, 503
Yellowtail.....do	11, 448	44, 272
Meal.....tons	6, 705	191, 015
White bass:		
Fresh fillets.....pounds	26, 746	3, 951
Frozen fillets.....do	9, 528	1, 158
Whitefish:		
Fresh fillets.....do	5, 771	744
Smoked [5].....do	2, 419, 473	639, 571
Caviar, canned.....standard cases	912	37, 678
Whiting, smoked [4].....pounds	50	5
Wolffish:		
Fresh fillets.....do	75, 800	10, 387
Frozen fillets.....do	254, 830	24, 079
Yellow perch:		
Fresh fillets.....do	2, 680, 559	507, 214
Frozen fillets.....do	219, 239	37, 472
Crabs:		
Meat, packaged, fresh cooked [2].....do	5, 574, 331	1, 903, 949
Canned.....standard cases	11, 614	191, 532
Dry scrap and meal.....tons	1, 713	26, 475
Crabs, king, meal and dry scrap.....do	702	24, 717
Lobsters:		
Common, packaged, fresh cooked [2].....pounds	939, 020	307, 420
Spiny packaged, fresh cooked.....do	56, 500	21, 738
Shrimp:		
Frozen, packaged.....do	2, 299, 800	379, 467
Sun dried.....do	1, 860, 775	279, 714
Cooked and peeled.....do	1, 367, 016	315, 789
Canned.....standard cases	1, 021, 822	4, 403, 077
Meal or "bran".....tons	1, 212	23, 569
Abalone, steaks.....pounds	627, 300	183, 990
Clams, hard:		
Fresh shucked [2].....gallons	13, 646	21, 781
Canned:		
Whole.....standard cases	17, 962	89, 689
Chowder.....do	349, 955	1, 448, 483
Minced.....do	15, 206	77, 861
Broth, bouillon and cocktail.....do	5, 981	34, 256
Juice and nectar.....do	8, 820	38, 945
Clams, razor:		
Fresh shucked [4].....gallons	36, 078	17, 729
Canned:		
Whole.....standard cases	1, 143	9, 994
Minced.....do	49, 160	386, 833
Juice.....do	126	378
Clams, soft:		
Fresh shucked [4].....gallons	129, 286	120, 024
Steamed [4].....pounds	[3] 161, 887	11, 279
Canned:		
Whole.....standard cases	89, 871	321, 399
Chowder.....do	82, 027	269, 420
Juice and bouillon.....do	12, 804	35, 970
Clams, surf, fresh shucked [4].....gallons	5, 922	4, 050
Clam shells, ground, poultry feed.....tons	1, 735	16, 662

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Marine-shell products:		
Buttons ... gross	4, 639, 176	$2, 880, 341
Novelties		536, 519
Mussels, fresh water, shell products:		
Buttons ... gross	14, 512, 880	3, 502, 233
Novelties		137, 166
Lime ... tons	1, 938	4, 427
Poultry feed ... do	6, 890	41, 010
Oysters:		
Eastern:		
Fresh shucked [2] ... gallons	5, 908, 748	7, 231, 854
Canned ... standard cases	369, 045	1, 548, 423
Japanese:		
Fresh shucked ... gallons	265, 441	353, 051
Canned ... standard cases	69, 497	322, 637
Native, Pacific, fresh shucked ... gallons	32, 334	187, 538
Shell products:		
Poultry feed ... tons	250. 509	1, 287, 440
Lime ... do	45, 100	113, 324
Lime, "burned" ... do	9, 277	51, 510
Scallops, bay, fresh shucked [2] ... gallons	83, 122	271, 947
Scallops, sea, fresh shucked [2] ... do	381, 798	397, 933
Turtles and terrapin, meat and soup, canned ... standard cases	3, 204	58, 232
Whales:		
Meal, meat ... tons	1, 349	37, 505
Oil, whale ... gallons	1, 060, 950	246, 670
Oil, sperm ... do	79, 000	17, 530
Unclassified products:		
Fillets, fresh ... pounds	[9] 92, 300	9, 316
Fillets, frozen ... do	[10] 831, 670	94, 503
Miscellaneous, packaged, fresh and frozen ... do	[11] 2, 769, 901	246, 034
Salted [2] ... do	[12] 257, 342	21, 652
Smoked [2] ... do	[13] 38, 912	10, 203
Canned:		
Fish for cat and dog food ... standard cases	301, 508	823, 440
Fish cakes, etc ... do	77, 595	609, 889
Fish flakes ... do	36, 540	326, 372
Other ... do	[14] 58, 921	351, 527
Acid, dry and green scrap ... tons	1, 574	35, 384
Meal ... do	12, 914	564, 425
Oil ... gallons	[15] 76, 395	195. 368
Glue ... do	398, 860	804, 688
Other byproducts		[16] 378, 838
Total, fresh and frozen packaged products [2] ... pounds	150, 592, 819	20, 678, 362
Total, cured products [5] ... do	98, 141, 332	13, 047, 069
Total, canned ... do	700, 157, 272	80, 021, 342
Total, byproducts		22, 608, 219
Grand total		136, 354, 992

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[1] Data are for 1934 unless otherwise indicated.

[2] This item represents a combination of 1934 and 1933 data.

[3] This is usually an intermediate product and although shown in the total may also be shown in its final stage of processing elsewhere in the table.

[4] Data are for 1933.

[5] This item represents a combination of 1934, 1933, and 1931 data.

[6] This item represents a combination of 1933 and 1931 data.

[7] Data are for 1931.

[8] This item represents a combination of 1934 and 1931 data.

[9] Includes fresh fillets of bluefish, snook, Spanish mackerel, and whiting.

[10] Includes frozen fillets of groupers, lake herring, mullet, rosefish, red snapper, Spanish mackerel, squeteagues, and whiting.

[11] Includes fresh steaks of wolffish; frozen steaks of cod, swordfish, and wolffish; frozen pandressed croaker and squeteagues; frozen sticks of whiting; and fresh halibut cheeks.

[12] Includes salted barracuda, black and white sea bass, pilchard, sea herring fillets and splits, and spot; green-salted halibut; dry-salted tongues; spiced chubs; and pickled shrimp.

[13] Includes smoked bonito, cod, flounders, goosefish, halibut, herring, kingfish, mullet, smelt, and Spanish mackerel.

[14] Includes canned pickled eels; gefilte fish; ground-fish roe; haddock, finnan haddie, and chowder; herring canned for bait; tuna cocktail; conch chowder; oyster puree; pickled sea mussels; rat poison; squid; frog products; and miscellaneous canned fish and chowder.

[15] Includes miscellaneous fish oils.

[16] Includes alligator hides, isinglass, kelp products, shark fins and hides, salmon egg meal, clam meal, and mussel-shell stucco and chips.

NOTE.—Some of the above products may have been manufactured from products imported from another country; therefore, they cannot be correlated directly with the catch within the United States and Alaska.

CANNED FISHERY PRODUCTS AND BYPRODUCTS TRADE

The output of canned fishery products and byproducts in the United States and Alaska in 1934 was valued at $102,619,379. Of this total, canned products comprised $80,021,342, and byproducts, $22,598,037—an increase of 34 percent in the value of canned products and 29 percent in the value of byproducts when compared with the respective values of the same groups of commodities for the previous year.

Fishery products were canned at 387 establishments in the United States and Alaska during 1934. The combined output of these canneries amounted to 17,378,902 standard cases. The net weight of the products canned amounted to 700,157,272 pounds.

Canned fishery products or byproducts were prepared in 27 States and in Alaska during 1934. Alaska ranked first in the value of the products, accounting for 38 percent of the total, and California ranked second with 27 percent.

Canned fishery products and byproducts of the United States and Alaska, 1934

SUMMARY OF PRODUCTION: BY COMMODITIES

Product	Number of plants	Standard cases	Pounds	Value
Canned products:				
Salmon:				
United States	42	901, 206	43. 257, 888	$8, 205, 947
Alaska	110	7, 481, 830	359, 127, 840	37, 611, 950
Sardines:				
Maine	22	1, 142, 730	28. 568, 250	3, 315, 190
California	20	1, 970, 047	94, 562, 256	5, 481, 391
Tuna and tunalike fishes	13	1, 966, 943	47, 206, 632	10, 009, 542
Alewives	8	18, 499	887, 952	54, 044
Alewife roe	24	19, 132	918, 336	83, 331
Shad	10	8, 233	395, 184	24, 458
Shad roe	10	2, 118	101, 664	58, 857
Mackerel	22	1, 275, 419	61, 220, 112	3, 244, 944
Fish flakes	3	36, 540	1, 753, 920	326, 372
Fish cakes, balls, etc	5	77, 595	3, 724, 560	609, 889
Cat and dog food	7	301, 508	14, 472, 384	823, 440
Miscellaneous fish	12	4, 366	209, 568	31, 945
Sturgeon caviar	6	3, 128	150, 144	397, 036
Whitefish roe and caviar	4	912	43, 776	37, 678
Salmon eggs (for bait)	9	5, 044	242, 112	128, 453
Miscellaneous roe and caviar	4	16, 518	792, 864	116, 173
Oysters	46	438, 542	6, 578, 130	1, 871, 060
Shrimp	51	1, 021, 822	16, 973, 860	4, 403, 077
Clam products	62	[1] 633, 055	16, 391, 520	2, 713, 228
Crabs	14	11, 614	557, 472	191, 532
Terrapin products	3	52	2, 496	4, 606
Turtle products	3	3, 152	151, 296	53, 626
Miscellaneous shellfish	6	38, 897	1, 867. 056	223, 573
Total	[2] 388	17, 378, 902	700, 157, 272	80, 021, 342

Product		Quantity	Value
Byproducts:			
Oyster-shell products	tons	306, 621	$1, 468, 936
Fresh-water mussel-shell products			3, 973. 153
Marine pearl-shell products			3, 416, 360
Scrap, meal, etc	tons	197, 424	6, 087, 211
Marine-animal oils	gallons	29, 965, 452	6. 385, 309
Miscellaneous byproducts			1, 267, 068
Total			22, 598, 037
Grand total			102, 619, 379

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[1] "Cut-out" or "drained" weights of can contents are included for whole and minced clams, and gross can contents for other clam products.

[2] Exclusive of duplication.

Canned fishery products and byproducts of the United States and Alaska, 1934—Con.

VALUE OF PRODUCTION: BY STATES

State	Canned products	Byproducts	Total
Maine	$4,251,142	$323,328	$4,574,470
Massachusetts	1,092,131	1,602,779	2,709,402
Rhode Island		14,492	
Connecticut		772,001	772,001
New York	512,059	1,412,372	1,924,431
New Jersey	1,344,023	1,451,167	3,234,400
Pennsylvania		439,210	
Delaware		303,208	303,208
Maryland	266,478	596,191	862,669
Virginia	39,264	1,026,565	1,065,829
North Carolina and South Carolina	474,542	406,322	1,395,940
Georgia	515,076		
Florida	412,617	756,665	1,169,282
Alabama and Mississippi	1,804,816	80,770	1,885,586
Louisiana	2,409,369	451,852	2,861,221
Texas and Wisconsin	465,989	99,056	565,045
Missouri, Illinois, Kansas, and Indiana		78,817	78,817
Iowa		2.993,355	2,993,355
Washington	6.026,551	162.546	6,189,097
Oregon	3,015,285	35.804	3,051,089
California	19,405,810	8,235,322	27,641,132
Alaska	37,986,190	1,356,215	39,342,405
Total	80,021,342	22,598,037	102,619,379

PACK OF CANNED SALMON: STANDARD CASES

Product	Alaska							
	Southeast		Central		Western		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	6,704	$37,288	20,623	$113,795	5,339	$30,952	32,666	$182,035
1-pound flat	4,633	34,426	3.609	33,695	1,972	12,226	10,214	80,347
½-pound flat	4,257	42,719	4.240	43,717	1,486	13,081	9,983	99,517
Total	15.594	114,433	28,472	191,207	8,797	56,259	52,863	361,899
Blueback, red or sockeye:								
1-pound tall	70,298	459,108	588,365	3,852,068	1,807,872	11,925,575	2,466,535	16,236,751
1-pound flat	11,904	92,854	58,589	428,947	2,937	22,338	73,430	544,139
½-pound flat	22,196	220,224	62,516	615,161	3,339	32,379	88,051	867,764
Total	104,398	772,186	709,470	4,896,176	1,814,148	11,980,292	2,628,016	17.648,654
Silver or coho:								
1-pound tall	146,634	755,434	74,196	379,374	1,219	6,273	222,049	1,141,081
1-pound flat	6,826	38,958	1,457	7,701			8 283	46,659
½-pound flat	5,067	40,540	718	5,470			5,785	46,010
Total	158,527	834,932	76,371	392,545	1,219	6,273	236,117	1,233,750
Humpback or pink:								
1-pound tall	2,593,066	10,633,959	1,198,707	4.826,930	1,959	8,132	3,793,732	15,469,021
1-pound flat	1,621	7,134	47	188			1,668	7,322
½-pound flat	27,675	182,478	1,118	6,981			28,793	189,459
Total	2,622,362	10,823,571	1,199.872	4,834,099	1,959	8,132	3,824,193	15,665,802
Chum or keta:								
1-pound tall	391,975	1,422,980	313,172	1,138,195	33,196	127,383	738,343	2,688,558
½-pound flat	2,237	12,941	61	346			2,298	13,287
Total	394,212	1.435,921	313,233	1 138,541	33,196	127,383	740,641	2,701,845
Grand total	3,295,093	13,981,043	2,327,418	11,452,568	1,859,319	12,178,339	7,481,830	37,611,950

Canned fishery products and byproducts of the United States and Alaska, 1934—Con

PACK OF CANNED SALMON: STANDARD CASES—Continued

Product	United States						Grand total, Alaska and United States	
	Washington		Oregon		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	14,605	$80,945	33,612	$142,710	48,217	$223,655	80,883	$405,690
1-pound oval	174	3,654	383	8,043	557	11,697	557	11,697
1-pound flat	15,338	132,310	39,761	339,169	55,099	471,479	65,313	551,826
½-pound oval			1,411	36,686	1,411	36.686	1,411	36,686
½-pound flat	43,990	549,222	109.383	1,333,195	153,373	1,882,417	163,356	1,981,934
¼-pound flat			12,344	178,619	12,344	178,619	12,344	178,619
Total	74,107	766,131	196,894	2,038,422	271,001	2 804,553	323,864	3,166,452
Blueback, red or sockeye:								
1-pound tall	87,153	606,585			87,153	606,585	2,553,688	16,843,336
1-pound flat	61,095	535,192			61,095	535,192	134,525	1,079,331
½-pound flat	205,923	2,473,000	3,603	51,883	209,526	2,524,883	297,577	3,392,647
¼-pound flat	998	15,968	1,539	28,318	2,537	44,286	2,537	44,286
Total	355,169	3,630,745	5,142	80,201	360,311	3,710,946	2,988,327	21,359,600
Silver or coho:								
1-pound tall	14,350	73,767	2,642	13,210	16,992	86,977	239.041	1,228,058
1-pound flat	17,847	107,082	8,720	52,320	26,567	159,402	34,850	206,061
½-pound oval			274	3,836	274	3,836	274	3,836
½-pound flat	37,197	302,610	26,299	210,392	63,496	513,002	69,281	559,012
¼-pound flat	2,473	25,719	25,764	280,828	28,237	306,547	28,237	306,547
Total	71,867	509,178	63,699	560,586	135,566	1,069,764	371,683	2,303,514
Humpback or pink:								
1-pound tall	1,130	4,520			1,130	4,520	3,794,862	15,473,541
1-pound flat	97	427			97	427	1.765	7,749
½-pound flat	2,346	14,545			2,346	14,545	31,139	204,004
Total	3,573	19,492			3,573	19,492	3,827,766	15,685,294
Chum or keta:								
1-pound tall	75,075	271,315	24,302	87,187	99,377	358,502	837,720	3,047,060
1-pound flat	43	172	470	1,880	513	2,052	513	2 052
½-pound flat	13,132	76,210	1,651	10,732	14,783	86,942	17,081	100 229
Total	88,250	347.697	26.423	99,799	114,673	447 496	855,314	3,149,341
Steelhead:								
1-pound tall			1,185	4,740	1,185	4,740	1,185	4,740
1-pound flat	2,796	17,335	855	5.301	3,651	22,636	3,651	22,636
½-pound oval			3,128	45,043	3,128	45,043	3,128	45,043
½-pound flat	318	2,544	4,088	32,704	4,406	35,248	4,406	35,248
¼-pound flat			3 712	46,029	3,712	46,029	3,712	46,029
Total	3,114	19,879	12,968	133,817	16,082	153,696	16,082	153,696
Grand total	596,080	5,293,122	305,126	2,912,825	901,206	8,205.947	8,383,036	45,817,897

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 1-pound cans to the case. Salmon were canned at 32 plants in Washington, 10 in Oregon, and 110 in Alaska.

PACK OF CANNED SARDINES

Sardines (herring)	Maine	
	Cases	*Value*
Quarters, ¼-pound (100 cans):		
In cottonseed oil	[4] 984,058	[4] $2,864,464
In mustard	90,985	285,315
In other sauces or oils	7,252	42,622
Three-quarters, ¾-pound (48 cans):		
In mustard	41,969	122,789
Total	1,124,264	3,315,190
Total (standard cases)	1,142,730	

Sardines (pilchard)	California	
	Cases	*Value*
1-pound oval (48 cans):		
In cottonseed oil	2,891	$7,598
In mustard	276,426	732,243
In tomato sauce	1,312,263	3,562,719
In natural oil	25,793	66,835
In other sauces or oils	13,382	47,700
½-pound oval (48 cans):		
In various sauces or oils	15,417	40,147
1-pound tall (48 cans):		
In natural oil	164,271	369,394
In other sauces or oils	12,231	27,519
5-ounce Eastern oyster (100 cans):		
In natural oil	165,418	424,664
In other sauces or oils	68,098	183,798
Other sizes:		
In various sauces or oils (standard cases)	3,063	18,774
Total	2,059,253	5,481,391
Total (standard cases)	1,970,047	

[4] Includes a small amount packed in 6-ounce cans, 100 to the case, which has been converted to the basis of 4-ounce cans, 100 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the uniform basis of one hundred ¼-pound cans to the case of sardines (herring), and forty-eight 1-pound cans to the case of sardines (pilchard). Sardines were canned at 22 plants in Maine and 20 in California.

Canned fishery products and byproducts of the United States and Alaska, 1934—Con

PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA

Size	Albacore		Yellowfin		Bluefin		Striped	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound (48 cans)	1,872	$7,358	132,582	$472,318	26,488	$86,299	[5] 24,722	[5] $78,869
¼-pound (100 cans)								
½-pound (48 cans)	66,857	390,900	759,334	3,987,914	259,324	1,171,559	183,750	833,989
1-pound (48 cans)	[6] 7,140	[6] 77,477	[6] 75,128	[6] 717,451	[6] 13,630	[6] 112,681	11,445	93,212
Flakes (standard cases)	8,526	36,584	[7] 124,891	[7] 502,820	12,369	50,194	[7] 7,358	[7] 28,729
Total	84,395	512,319	1,091,935	5,680,503	311,811	1,420,733	227,275	1,034,799
Total (standard cases)	90,599		1,100,772		312,198		226,359	

Size	"Tonno"		Bonito		Yellowtail		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound (48 cans)			184	$557			185,848	$645,401
¼-pound (100 cans)	145,585	$981,493	2,875	18,104			148,460	999,597
½-pound (48 cans)	15,843	100,825	43,190	174,076	8,464	$33,852	1,336,762	6,693,115
1-pound (48 cans)			5,903	41,861	1,492	10,420	114,738	1,053,102
Flakes (standard cases)							153,144	618,327
Total	161.428	1,082,318	52,152	234,598	9,956	44.272	1,938,952	10,009,542
Total (standard cases)	167,484		58,083		11,448		1,966,943	

[5] Includes the pack in ¼-pound cans, 100 to the case, which has been converted to the equivalent of ¼-pound cans, 48 to the case.

[6] Includes the pack in 4-pound cans, 12 to the case, which has been converted to the equivalent of 1-pound cans, 48 to the case.

[7] Includes the pack of creamed tuna flakes, in ¾-pound cans, 48 to the case, which has been converted to the equivalent of ½-pound cans, 48 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight ½-pound cans to the case. Tuna and tunalike fishes were canned at 13 plants in California.

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: STANDARD CASES

Product	Maryland		Virginia and North Carolina		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Alewives	17,951	$52,585	[8] 548	[8] $1,459	18,499	$54,044
Alewife roe	5,525	29,917	13,607	53,414	19,132	83,331
Total	23,476	82,502	14,155	54,873	37,631	137,375

[8] This entire pack was canned in Virginia.

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: ACTUAL CASES

Product and size	Cases	Value
Alewives:		
16-ounce (48 cans)	15,052	$44,651
10-ounce (48 cans) and 17- and 19-ounce (24 cans)	5,959	9,393
Total		54,044
Alewife roe:		
8-ounce (48 cans)	7.039	19,729
7½- and 10-ounce (48 cans)	1,519	2,660
10-, 16-, and 19-ounce (24 cans)	6,447	13,668
17-ounce (24 cans)	22,644	47,274
Total		83.331
Grand total		137,375

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case. Alewives or alewife roe were canned at 7 plants in Maryland, 15 in Virginia, and 3 in North Carolina.

Canned fishery products and byproducts of the United States and Alaska, 1934— Con.

PACK OF CANNED OYSTERS: STANDARD CASES

State	Cases	Value
New Jersey, Maryland, Georgia, and Alabama	19. 323	$80, 717
South Carolina	91, 752	392, 551
Florida	12, 980	51, 331
Mississippi	195, 857	822, 031
Louisiana	49, 133	$201, 793
Washington and Oregon	69, 497	322, 637
Total	438, 542	1, 871, 060

PACK OF CANNED OYSTERS: ACTUAL CASES

Size	Cases	Value
4-ounce (48 cans)	32, 746	$125, 976
5-ounce (48 cans)	324, 444	1, 360, 080
6-ounce (48 cans)	2, 627	12, 694
8-ounce (24 cans)	13, 131	50, 786
8-ounce (48 cans)	23, 680	$170, 248
10-ounce (24 cans)	36, 356	151, 276
Total	--------	1, 871, 060

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 5-ounce cans to the case. Oysters were canned at 1 plant in New Jersey, 1 in Maryland, 4 in South Carolina, 1 in Georgia, 3 in Florida, 2 in Alabama, 16 in Mississippi, 8 in Louisiana, 9 in Washington, and 1 in Oregon.

PACK OF CANNED CLAMS AND CLAM PRODUCTS

Item and State	Cases	Value
Razor clams (Washington, Oregon, and Alaska):		
Whole:		
½-pound, 4-ounce (48 cans)	76	$912
No. 1, 5-ounce (48 cans)	612	5, 234
1-pound, 8-ounce (48 cans)	294	3, 848
Minced:		
½-pound, 4-ounce (48 cans)	54, 492	348. 664
No. 1, 5-ounce (48 cans)	4. 984	33, 953
1-pound, 8-ounce (48 cans)	81	624
No. 2, 10-ounce (24 cans)	452	3, 592
Juice:		
All sizes (standard cases)	126	378
Total	61, 117	397, 205
Total (standard cases)	50, 429	---------
Hard clams (Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Florida, Washington, and Alaska)[9]		
Whole:		
No. 1, 5-ounce (48 cans)	2, 064	16, 130
1-pound, 8-ounce (48 cans)	2, 108	14, 348
No. 2, 10-ounce (24 cans)	4, 608	27, 347
No. 10, 52-ounce (6 cans)	5, 344	25. 662
Other sizes (standard cases)	913	6, 058
Minced:		
½-pound, 4-ounce (48 cans)	8, 799	27, 640
No. 1, 5-ounce (48 cans)	1, 769	8, 511
No. 10, 52-ounce (6 cans)	3, 027	26, 553
Other sizes (standard cases)	2, 520	15, 301
Chowder:		
No. 1, 10-ounce (48 cans)	144, 409	549, 277
33-ounce (12 cans)	20, 094	59, 745
No. 10, 102-ounce (6 cans)	1, 441	13, 971
Other sizes (standard cases)	187. 131	825, 490
Hard clams—Continued.		
Juice:		
No. 1, 10-ounce (48 cans)	1, 705	$9, 551
No. 10, 102-ounce (6 cans)	2, 170	6, 835
Other sizes (standard cases)	4, 141	21, 519
Cocktail;		
All sizes (standard cases)	1, 486	10, 385
Broth and nectar:		
All sizes (standard cases)	4, 703	24, 911
Total	398, 432	1, 689, 234
Total (standard cases)	397, 924	---------
Soft clams (Maine and Massachusetts):		
Whole:		
No. 1, 5-ounce (48 cans)	62, 837	230, 727
1 pound, 8-ounce (48 cans)	7, 573	39, 968
No. 2, 10-ounce (24 cans)	14, 570	49, 214
Other sizes (standard cases)	347	1, 490
Chowder:		
No. 1. 10-ounce (48 cans)	30, 257	106, 726
17-ounce (24 cans)	18, 066	67, 105
No. 10, 102-ounce (6 cans)	1, 450	6, 268
Other sizes (standard cases)	34, 565	89, 321
Bouillon and juice:		
All sizes (standard cases)	12, 804	35, 970
Total	182, 469	626, 789
Total (standard cases)	184, 702	---------
Grand total (standard cases)	633, 055	2, 713, 228

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[9] Includes a small amount of coquina broth packed in Florida.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 No. 1, 5-ounce cans to the case for whole and minced clams; and 48 No. 1, 10-ounce cans to the case for other clam products. Razor clams were canned at 8 plants in Washington, 4 in Oregon, and 9 in Alaska; hard clam products at 1 plant in Massachusetts, 1 in Rhode Island, 2 in New York, 2 in New Jersey, 1 in Pennsylvania, 2 in Maryland, 3 in Florida, 6 in Washington, and 1 in Alaska; soft clam products, at 20 plants in Maine, and 1 in Massachusetts; and coquina clam products, at 1 plant in Florida.

Canned fishery products and byproducts of the United States and Alaska, 1934—Con.

PACK OF CANNED SHRIMP: STANDARD CASES

State	Dry pack (in tins)		Wet pack (in tins)		Wet pack (in glass)		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
South Carolina, Alabama, and Texas	56,687	$231.295	123,699	$497,087	(10)	(10)	180,386	$728,382
Georgia	19,771	87,000	54,351	228,896	[10] 46,296	[10] $310,721	120,418	626,617
Florida	1,195	5,463	33,160	142,400	14,212	87,025	48.567	234,888
Mississippi	47,203	196,640	113,916	474,873			161,119	671,513
Louisiana	165,175	714,387	346.131	1,427,011	(10)	(10)	511,306	2,141,398
Alaska					26	279	26	279
Total	290,031	1,234,785	671,257	2,770,267	60,534	398,025	1,021,822	4 403,077

PACK OF CANNED SHRIMP: ACTUAL CASES

Size	Cases	Value	Size	Cases	Value
In tins, dry:			In glass, wet:		
4-ounce (48 cans)	8,035	$28,786	4-ounce (24 jars)	7,013	$22,054
5-ounce (48 cans)	267,140	1,116,643	5¾-ounce (24 jars)	29,515	94,976
8¼-ounce (24 cans)	19,429	87,139	6-ounce (24 jars)	77,034	270,069
Other sizes (standard cases)	434	2,217	Other sizes (standard cases)	3,150	10,926
In tins, wet:					
5¾-ounce (48 cans)	664,635	2,737,798	Total		4,403,077
9¾-ounce (24 cans)	7,157	29,603			
Other sizes (standard cases)	554	2,866			

[10] The pack of shrimp in glass for Louisiana and Texas has been included with that of Georgia to avoid disclosure of private enterprise.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48, 5-ounce cans to the case in dry pack and 48, 5¾-ounce cans to the case in the wet pack. Shrimp were canned at 1 plant in South Carolina, 6 in Georgia, 5 in Florida, 2 in Alabama, 15 in Mississippi, 20 in Louisiana, 2 in Texas, and 1 in Alaska.

PACK OF MISCELLANEOUS CANNED FISHERY PRODUCTS: STANDARD CASES

Product	Atlantic and Gulf coasts [11]		Pacific coast (including Alaska)		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Mackerel	24,868	$157,140	1,250,551	$3,087,804	1,275,419	$3,244,944
Shad			8,233	24,458	8,233	24,458
Shad roe			2,118	58,857	2,118	58,857
Fish flakes [12]	36,540	326,372			36,540	326,372
Cat and dog food	13,756	27,850	287,752	795,590	301,508	823,440
Fish cakes, balls, etc	77,595	609,889			77,595	609,889
Miscellaneous fish [13]	2,949	25,135	1,417	6,810	4,366	31,945
Sturgeon caviar	[14] 3,128	[14] 397,036	(14)	(14)	3,128	397,036
Whitefish roe and caviar	912	37,678			912	37,678
Salmon eggs for bait			5,044	128,453	5,044	128,453
Miscellaneous roe and caviar [15]	16,518	116,173			16,518	116,173
Crabs	(16)	(16)	[16] 11,614	[16] 191,532	11,614	191,532
Terrapin products	52	4,606			52	4,606
Turtle products	3,152	53,626			3,152	53,626
Miscellaneous shellfish, etc.[17]	36,983	212,924	1,914	10,649	38,897	223,573
Total	216,453	1,968,429	1,568,643	4,304,153	1,785,096	6,272,582

[11] Includes 1 firm producing whitefish caviar in Wisconsin.

[12] Tuna flakes are not included in this table, but are included in the table for canned tuna and tunalike fishes.

[13] Includes finnan haddie, smoked king salmon, Dolly Varden trout, gefilte fish, bait herring, pickled eels, fish chowder, tuna cocktail, and fish prepared for poisoning rats.

[14] The production of one firm in Washington is included with the Atlantic and Gulf coasts.

[15] Includes salmon roe and caviar and ground-fish roe.

[16] The production of 1 firm in Virginia is included with the Pacific coast.

[17] Includes pickled mussels, squid, oyster purée, and conch and frog products.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48, 1-pound cans to the case.

Canned fishery products and byproducts of the United States and Alaska, 1934—Con.

PRODUCTION OF OYSTER-SHELL PRODUCTS [18]

State	Crushed oyster-shell for poultry feed		Oyster-shell lime		Total	
	Tons	*Value*	*Tons*	*Value*	*Tons*	*Value*
Rhode Island and Delaware	1, 151	$9, 988	324	$1, 349	1, 475	$11, 337
New Jersey	4, 951	41, 104	2, 083	8, 986	7, 034	50, 090
Pennsylvania	2, 978	26, 192	1, 169	4, 208	4, 147	30, 400
Maryland	35, 602	178, 443	21, 346	35, 483	56, 948	213, 926
Virginia	10, 689	57, 235	[19] 18, 653	[19] 78, 296	29, 342	135, 531
North Carolina and South Carolina	3, 841	26, 667	[20] 1, 550	[20] 5, 975	5, 391	32, 642
Florida	54, 477	264, 403	(21)	(20)	54, 477	264, 403
Alabama, Louisiana, and Texas	104, 616	512, 318	8, 197	27, 538	112, 813	539, 856
Mississippi	14, 029	67, 745	(21)	(21)	14, 029	67, 745
Washington	3. 595	33, 618			3, 595	33, 618
Oregon and California	16, 315	86, 389	[21] 1, 055	[21] 2, 999	17, 370	89, 388
Total	252, 244	1, 304, 102	54, 377	164, 834	306, 621	1, 468, 936

[18] The production in Washington was from both crushed clam shells and oyster shells.

[19] Of this amount 9,027 tons valued at $50,135 were reported as "burned" lime.

[20] The production of oyster-shell lime in Florida has been included with that of North Carolina and South Carolina.

[21] The production of oyster-shell lime in Mississippi has been included with that of Oregon and California.

NOTE.—The above crushed-shell products were prepared at 2 plants in Rhode Island, 9 in New Jersey, 4 in Pennsylvania, 1 in Delaware, 5 in Maryland, 8 in Virginia, 4 in North Carolina, 2 in South Carolina, 3 in Florida, 2 in Alabama, 4 in Mississippi, 1 in Louisiana, 3 in Texas, 6 in Washington, 1 in Oregon, and 5 in California.

PRODUCTION OF FRESH-WATER MUSSEL-SHELL PRODUCTS

Item	Iowa		New York		Other States		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Pearl buttons gross	11, 422, 475	$2, 849, 520	3, 438, 542	$855, 579	392, 800	$80, 300	15, 253, 817	$3, 785, 399
Crushed shell for poultry feed tons	6, 340	37, 514			540	3, 417	6, 880	40, 931
Lime do	1, 600	3, 925	113	277	225	225	1, 938	4, 427
Other products [22]		102, 396				40, 000		142, 396
Total		2, 993, 355		855, 856		123, 942		3, 973, 153

[22] Includes stucco, colored shells, and "pearl novelties."

NOTE.—Mussel shells utilized in the above production amounted to 49,456,000 pounds, valued at $646,685. Shells were taken in 18 States in the Mississippi River Valley and Great Lakes region. The producing States in order of their importance were Arkansas, which contributed 22 percent of the total quantity; Illinois, 20 percent; Indiana, 14 percent; Tennessee, 12 percent; Michigan and Kentucky, each 6 percent; Iowa, Wisconsin, and Ohio, each 4 percent; Minnesota, 3 percent; Texas, 2 percent; Alabama, Mississippi, and Missouri, each 1 percent; and Kansas, Oklahoma, Louisiana, and South Dakota, each less than ½ of 1 percent.

PRODUCTION OF MARINE PEARL-SHELL PRODUCTS [23]

Item	Maine, Massachusetts, Rhode Island, and Connecticut		New York		New Jersey	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons	1, 481, 853	$824, 762	512, 531	$391, 109	1, 267, 703	$955, 660
Novelties [24]		242, 618		44, 066		130, 619
Total		1, 067, 380		435, 175		1, 086, 279

Item	Pennsylvania, Maryland, and Florida		Oregon and California		Total	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons	1, 377, 089	$708, 810			4, 639, 176	$2, 880, 341
Novelties [24]		73, 400		$45, 316		536, 019
Total		782, 210		45, 316		3, 416, 360

[23] Produced principally from imported shells.

[24] Includes buckles, inlays for jewelry, knife handles, lamps, handles of manicure sets, etc.

NOTE.—Marine pearl-shell products were manufactured at 1 plant in Maine, 2 in Massachusetts, 1 in Rhode Island, 6 in Connecticut, 10 in New York, 20 in New Jersey, 2 in Pennsylvania, 1 in Maryland, 3 in Florida, 2 in Oregon, and 2 in California.

Canned fishery products and byproducts of the United States and Alaska, 1934—Con.

FISH UTILIZED AND PRODUCTS OF THE MENHADEN INDUSTRY

State	Menhaden utilized	Products						
		Dry scrap and meal		Acidulated scrap		Oil		Total
	Number	*Tons*	*Value*	*Tons*	*Value*	*Gallons*	*Value*	*Value*
New York, New Jersey, Delaware, and Georgia	241, 912, 000	7, 672	$255, 940	12, 116	$209, 764	1, 396, 190	$283, 828	$749, 532
Virginia	251, 732, 000	17, 645	565, 354	1, 027	15, 777	1, 253, 924	248, 401	829, 532
North Carolina	100, 582, 000	4, 210	144, 097	4, 768	85, 800	407, 000	72, 960	302, 857
Florida	178, 018, 000	8, 408	282, 306	4, 140	70, 218	555, 250	100, 468	452, 992
Total	[25]772,244, 000	[26] 37, 935	[26]1,247, 697	22, 051	381, 559	3, 612, 364	705, 657	2,334,913

[25] 463,346,000 pounds.

[26] Of this production, 32,450 tons, valued at $1,040,745, were reported as dry scrap, and 5,485 tons valued at $206,952 as fish meal.

NOTE.—The menhaden factories were located as follows: 1 in New York, 2 in New Jersey, 2 in Delaware, 10 in Virginia, 7 in North Carolina, 1 in Georgia, and 4 in Florida.

PRODUCTION OF MISCELLANEOUS BYPRODUCTS

Product	Atlantic and Gulf coasts [27]		Pacific coast (including Alaska)		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Dried scrap:						
Alewife ---- tons	520	$16, 508			520	$16, 508
Herring ---- do	1, 297	38, 122			1, 297	38, 122
Blue crab ---- do	1, 183	19, 485			1, 183	19, 485
King crab ---- do	370	14, 530			370	14, 530
Miscellaneous [28] ---- do	1, 609	37, 134			1, 609	37, 134
Meal:						
Ground fish "white fish" ---- do	10, 272	485, 124			10, 272	485, 124
Herring (Alaska) ---- do			13, 955	$442, 217	13, 955	442, 217
Herring (Maine) ---- do	1, 224	34, 741			1, 224	34, 741
Mackerel ---- do			3, 323	98, 392	3, 323	98, 392
Pilchard ---- do			89, 280	2, 878, 269	89, 280	2, 878, 269
Salmon ---- do			1, 737	46, 468	1, 737	46, 468
Tuna ---- do			6, 705	191, 015	6, 705	191, 015
Crab, blue and king ---- do	568	8, 322			568	8, 322
Shrimp ---- do	1, 234	21, 752	149	2, 980	1, 383	24, 732
Whale, meat ---- do			945	27, 405	945	27, 405
Whale, bone ---- do			404	10, 100	404	10, 100
Miscellaneous [29] ---- do	801	32, 090	1, 862	53, 301	2, 663	85, 391
Oil:						
Alewife ---- gallons	13, 250	1, 505			13, 250	1, 505
Cod ---- do	51, 132	22, 149			51, 132	22, 149
Cod liver ---- do	94, 312	56, 643			94, 312	56, 643
Herring (Alaska) ---- do			3, 710, 348	634, 059	3, 710, 348	634, 059
Herring (Maine) ---- do	61, 751	7, 780			61, 751	7, 780
Mackerel ---- do			157, 571	25, 533	157, 571	25, 533
Pilchard ---- do			20, 845, 171	4, 413, 609	20, 845, 171	4, 413, 609
Salmon ---- do			202, 458	57, 306	202, 458	57, 306
Whale:						
Sperm ---- do			79, 000	17, 530	79, 000	17, 530
Other ---- do			1, 060, 950	246, 670	1, 060, 950	246, 670
Miscellaneous [30] ---- do	8, 226	101, 987	68, 919	94, 881	77, 145	196, 868
Liquid glue ---- do	[31] 398, 860	[31] 804, 688	([31])	([31])	398, 860	804, 688
Pearl essence ---- pounds	13, 805	103, 475			13, 805	103, 475
Miscellaneous byproducts [32]		39, 380		319, 525		358, 905
Total		1, 845, 415		9, 559, 260		11, 404, 675

[27] Includes the production of burbot liver oil in Wisconsin.

[28] Includes ground-fish and miscellaneous dry scrap, as well as the production of miscellaneous acid scrap by 1 firm in Virginia.

[29] Includes salmon egg, clam, and miscellaneous meal.

[30] Includes tuna, shark, and miscellaneous oil.

[31] A quantity of liquid glue produced by 1 firm in California is included with the production of liquid glue of the Atlantic and Gulf coasts.

[32] Includes isinglass, shark skins, and fins, kelp products, and miscellaneous novelties.

NOTE.—The oils produced on the Pacific coast are reported in trade gallons (7½ pounds) and those produced on the Atlantic and Gulf coasts are reported in United States gallons (about 7.74 pounds).

FROZEN FISH TRADE [4]

FISH FROZEN

During 1934 the freezing plants which reported their activities to the Government, froze 133,493,952 pounds of fishery products. These products, at the time they were held in cold-storage plants, were estimated to be valued at about $12,000,000. Compared with the output in 1933 this was an increase of 39 percent. Five species or groups of species accounted for 62 percent of the total amount frozen. In order of their importance they were: Cod, haddock (including haddock fillets), hake, and pollock, which accounted for 19 percent of the total; halibut, 12 percent; salmon and mackerel, each, 11 percent; and whiting, 9 percent. Of the products frozen in considerable quantities during the year were included sea herring, shellfish, butterfish, and croaker.

Production of frozen fishery products, 1934

BY SPECIES AND MONTHS

Species	Month ended the 15th of—						
	January	February	March	April	May	June	July
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	27, 161	4, 480	3, 136	1, 083	20, 679	58, 706	61, 605
Butterfish (all trade sizes)	5, 711	4, 572	6, 259	36	13, 882	671, 421	1, 098, 917
Catfish	26, 609	13, 313	8, 272	37, 082	110, 750	114, 022	63, 058
Cisco (Lake Erie)	---------	---------	---------	---------	403	6, 322	7, 529
Cisco (lake herring), including bluefin, blackfin, and chub	23, 281	38, 319	4, 804	983	3, 394	25, 236	111, 266
Cisco (tullibees, Canadian lakes)	33, 025	2, 262	2, 961	4, 612	---------	6, 000	31, 767
Cod, haddock, hake, and pollock	160, 286	128, 590	107, 283	797, 340	628, 482	504, 516	850, 251
Croaker	4, 672	6, 429	3, 752	5, 429	561, 872	39, 661	284, 473
Flounders	16, 931	44, 742	15, 000	17, 490	155, 407	238, 109	194, 356
Haddock fillets	618, 594	606, 120	704, 580	1, 828, 521	2, 037, 425	2, 634, 211	1, 981. 256
Halibut (all trade sizes)	---------	---------	165, 798	2, 401, 449	2, 448, 821	3, 081, 236	2, 963, 820
Herring, sea (including alewives and bluebacks)	17, 388	14, 878	223, 584	270, 178	235, 462	1, 657, 740	1, 218, 797
Lake trout	17, 638	11, 591	3, 690	327	57, 206	189, 459	156, 544
Mackerel (except Spanish)	60, 915	85, 951	64, 433	21, 122	711, 637	1, 957, 503	1, 950, 639
Pike, blue and sauger	18, 412	1, 632	90	22	159, 671	382, 907	64, 997
Pike, yellow or wall-eyed	12, 904	22, 392	8, 874	---------	72, 053	48, 914	7, 620
Pike (including pickerel, jacks, and yellow jack)	4, 288	2, 219	1, 232	9, 042	21, 807	23, 772	11, 294
Sablefish (black cod)	12. 641	22, 704	21, 912	14, 386	46, 609	31, 497	51, 583
Salmon, chinook or king	18, 342	---------	11, 515	1, 070	17, 183	500, 502	402, 485
Salmon, silver or coho	25, 270	29. 520	61, 644	2, 105	11, 401	67, 176	391, 459
Salmon, fall and pink	103, 207	233, 800	38, 041	900	7, 529	2, 417	1. 244
Salmon, steelhead trout	20, 245	10, 441	30, 209	5, 825	3, 469	9, 015	202, 903
Salmon, red or sockeye	71, 087	219, 970	70, 741	17, 292	17, 119	19, 539	41. 448
Scup (porgies)	2, 391	---------	100	---------	13, 722	60, 521	158, 312
Shad and shad roe	22, 568	8, 983	10, 779	687	51, 217	79, 956	300, 283
Shellfish	157, 234	240, 158	219, 769	150, 508	613, 800	889, 348	292, 744
Smelts, eulachon, etc	146, 061	141, 875	174, 564	418, 595	87, 456	26, 714	33, 910
Squid	5, 015	---------	---------	6, 410	113. 001	748, 713	188, 820
Sturgeon and spoonbill cat	2, 705	3, 640	838	314	68, 752	33, 904	17, 365
Suckers	6, 595	4, 288	7, 311	---------	7, 372	12, 231	1, 436
Swordfish	(1)	(1)	(1)	(1)	(1)	(1)	20, 627
Weakfish (including southern "sea trout")	34, 637	2, 901	2, 088	---------	45. 074	140, 517	221, 711
Whitefish	28, 754	99, 163	22. 393	31, 562	55, 576	32, 338	81, 637
Whiting	37, 839	222, 989	136, 919	72, 885	202, 942	2, 428, 310	5, 195, 602
Miscellaneous fish	665, 741	511, 711	545, 115	795, 077	1, 832, 794	1, 519, 059	1, 420, 871
Total	2, 408, 148	2, 739, 633	2, 677, 686	6, 912, 332	10, 433, 967	18, 241, 492	20, 082, 629

[1] Prior to July 15, 1934, swordfish were included with "Miscellaneous fish."

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[4] The statistics in this section have been furnished by the Bureau of Agricultural Economics, Department of Agriculture.

Production of frozen fishery products, 1934—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	30, 872	237, 729	290, 311	119, 760	20, 063	875, 585
Butterfish (all trade sizes)	82, 830	76, 072	37, 847	312, 808	78, 864	2, 389, 219
Catfish	26, 688	31, 885	9, 170	22, 614	40, 465	503, 928
Cisco (Lake Erie)	3, 089	1, 008	556	29, 366	47, 267	95, 540
Cisco (lake herring), including bluefin, blackfin, and chub	160, 358	145, 008	113, 434	289, 757	770, 347	1, 686, 187
Cisco (tullibees, Canadian lakes)	7, 500	6, 859	5, 582	---------	3, 949	104, 528
Cod, haddock, hake, and pollock	539, 449	469, 591	727, 158	906, 741	2, 648, 486	8, 468, 173
Croaker	851, 721	233, 998	65, 155	19, 792	49, 805	2, 126, 759
Flounders	51, 726	24, 086	45, 907	80, 539	134, 080	1, 018, 373
Haddock fillets	1, 874, 151	2, 082, 872	1, 553, 296	427, 821	1, 162, 263	17, 511, 110
Halibut (all trade sizes)	2, 280, 711	1, 177, 260	632, 398	962, 922	195, 508	16, 309, 923
Herring, sea (including alewives and bluebacks)	475, 231	435, 847	289, 303	442, 353	384, 668	5, 665, 429
Lake trout	75, 864	69, 572	170, 502	395, 384	167, 313	1, 315, 090
Mackerel (except Spanish)	1, 932, 496	5, 298, 252	1, 902, 257	222, 743	39, 769	14, 247, 717
Pike, blue and sauger	24, 929	28, 715	40, 242	326, 911	312, 859	1, 361, 387
Pike, yellow or wall-eyed	4, 881	33, 232	23, 818	30, 058	6, 950	271, 696
Pike (including pickerel, jacks, and yellow jack)	5, 572	23, 490	10, 928	23, 555	8, 622	145, 821
Sablefish (black cod)	64, 424	170, 797	744, 055	581, 647	34, 634	1, 796, 889
Salmon, chinook or king	728, 309	940, 647	865, 899	196, 372	16, 790	3, 699, 114
Salmon, silver or coho	1, 811, 881	2, 846, 711	1, 280, 917	646, 093	83, 177	7, 257, 354
Salmon, fall and pink	27, 839	152, 740	497, 993	1, 854, 681	52, 239	2, 972, 630
Salmon, steelhead trout	268, 172	113, 312	20, 989	26, 829	4, 422	715, 831
Salmon, red or sockeye	18, 909	24, 398	26, 636	36, 753	27, 126	591, 018
Scup (porgies)	130, 794	55, 671	3, 937	5, 963	102	431, 513
Shad and shad roe	22, 053	22, 219	2, 194	16, 337	12, 226	549, 502
Shellfish	490, 456	432, 134	532, 944	798, 523	449, 302	5, 266, 920
Smelts, eulachon, etc	40, 744	67, 890	55, 724	100, 282	19, 544	1, 313, 359
Squid	223, 414	34, 862	115, 408	35, 145	7, 413	1, 478, 201
Sturgeon and spoonbill cat	28, 625	24, 716	23, 066	13, 353	6, 533	223, 811
Suckers	5, 921	209	4, 047	13, 332	1, 390	64, 132
Swordfish	176, 931	185, 360	37, 500	106, 211	9, 543	536, 172
Weakfish (including southern "sea trout")	279, 459	131, 835	227, 322	180, 896	18, 160	1, 284, 600
Whitefish	152, 380	35, 235	230, 576	158, 651	79, 054	1, 007, 319
Whiting	2, 186, 953	768, 234	272, 652	116, 009	127, 970	11, 769, 304
Miscellaneous fish	2, 297, 916	2, 103, 460	1, 866, 600	2, 552, 645	2, 328, 829	18, 439, 818
Total	17, 383, 248	18, 485, 916	12, 726, 323	12, 052, 846	9, 349, 732	133, 493, 952

BY GEOGRAPHICAL SECTIONS AND SPECIES [2]

[Expressed in thousands of pounds; that is, 000 omitted]

Species	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
Bluefish (all trade sizes)	59	739	1	37	-------	40	--------	876
Butterfish (all trade sizes)	462	1, 895	16	10	6	-------	--------	2, 389
Catfish	158	3	8	45	218	72	--------	504
Cisco (Lake Erie)	--------	96	-------	--------	-------	-------	--------	96
Cisco (lake herring), including bluefin, blackfin, and chub	--------	248	-------	1, 170	268	-------	--------	1, 686
Cisco (tullibees, Canadian lakes)	33	54	-------	12	6	-------	--------	105
Cod, haddock, hake, and pollock	7, 068	453	3	287	94	355	208	8, 468
Croaker	--------	498	1, 553	64	-------	12	--------	2, 127
Flounders	422	545	-------	6	14	3	28	1, 018
Haddock fillets	16, 590	58	31	755	69	-------	8	17, 511
Halibut (all trade sizes)	139	275	20	796	57	56	14, 967	16, 310
Herring, sea (including alewives and bluebacks)	4, 081	265	28	509	12	17	753	5, 665
Lake trout	3	243	19	929	120	1	--------	1, 315

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[2] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania: South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; and Pacific—Washington, Oregon, California, and Alaska.

Production of frozen fishery products, 1934—Continued

BY GEOGRAPHICAL SECTIONS AND SPECIES—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
Mackerel (except Spanish)	12,138	1,766	24	134	19	19	148	14,248
Pike, blue and sauger	--------	930	-------	431	-------	-------	--------	1,361
Pike, yellow or wall-eyed	--------	98	-------	140	33	1	--------	272
Pike (including pickerel, jacks, and yellow jack)	--------	24	-------	34	88	-------	--------	146
Sablefish (black cod)	--------	9	-------	42	12	-------	1,734	1,797
Salmon, chinook or king	41	63	-------	18	31	-------	3,546	3,699
Salmon, silver or coho	27	141	-------	30	39	-------	7,020	7,257
Salmon, fall and pink	1	34	-------	13	23	-------	2,902	2,973
Salmon, steelhead trout	--------	50	6	5	-------	-------	655	716
Salmon, red or sockeye	--------	23	-------	36	17	5	510	591
Scup (porgies)	50	382	-------	-------	-------	-------	--------	432
Shad and shad roe	343	111	-------	37	-------	2	56	549
Shellfish	638	1,832	153	934	650	32	1,028	5,267
Smelts, eulachon, etc	61	543	3	427	5	3	271	1,313
Squid	1,230	201	-------	1	-------	-------	46	1,478
Sturgeon and spoonbill cat	--------	134	-------	13	46	17	14	224
Suckers	--------	1	-------	50	-------	13	--------	64
Swordfish [1]	404	1	-------	1	-------	-------	130	536
Weakfish (including southern "sea trout")	1	1,148	136	-------	-------	-------	--------	1,285
Whitefish	16	700	1	256	30	3	1	1,007
Whiting	10,155	1,085	27	95	292	115	--------	11,769
Miscellaneous fish	4,340	1,715	1,737	4,702	1,021	1,898	3,027	18,440
Total	58,460	16,363	3,766	12,019	3,170	2,664	37,052	133,494

[1] Prior to July 15, 1934, swordfish were included with "Miscellaneous fish."

BY GEOGRAPHICAL SECTIONS AND MONTHS

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
January	759	544	197	372	95	109	332	2,408
February	631	407	56	348	310	181	807	2,740
March	711	394	3	396	259	258	657	2,678
April	2,969	119	12	695	110	137	2,870	6,912
May	3,505	1,550	856	947	295	157	3,124	10,434
June	9,358	2,571	155	1,614	465	225	3,853	18,241
July	12,053	2,443	355	729	164	303	4,036	20,083
August	7,795	1,616	1,399	972	129	190	5,282	17,383
September	9,351	1,437	372	1,110	164	251	5,801	18,486
October	4,824	1,784	103	1,142	182	361	4,330	12,726
November	2,132	2,421	123	1,678	387	277	5.035	12,053
December	4,372	1,077	135	2,016	610	215	925	9,350
Total	58,460	16,363	3,766	12,019	3,170	2,664	37,052	133,494

HOLDINGS

During 1934 monthly holdings of frozen fish and shellfish averaged 48,492,000 pounds, which is an increase of 23 percent as compared with the average monthly holdings in 1933. The holdings during October were largest, amounting to 77,151,000 pounds. However, the holdings during each of the months from September to December exceeded 70,000,000 pounds. The holdings during April were smallest when only 15,839,000 pounds of frozen fishery products were in storage.

Holdings of frozen fishery products, 1934

BY SPECIES AND MONTHS

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	396, 305	216, 788	130, 340	81, 857	77, 326	115, 052
Butterfish (all trade sizes)	818, 482	564, 374	367, 760	189, 967	120, 872	773, 730
Catfish	228, 046	148, 812	29, 512	61, 432	150, 840	253, 081
Cisco (Lake Erie)	64, 986	81, 187	79, 531	15, 498	6, 591	10, 787
Cisco (lake herring), including bluefin, blackfin, and chub	1, 672, 758	1, 286, 452	773, 027	464, 083	220, 135	220, 395
Cisco (tullibees, Canadian lakes)	308, 660	270, 244	211, 054	155, 548	74, 325	57, 607
Cod, haddock, hake, and pollock	1, 239, 513	569, 689	270, 013	743, 744	1, 014, 406	1, 050, 923
Croaker	359, 624	153, 233	82, 646	14, 044	586, 696	642, 315
Flounders	179, 844	109, 580	44, 266	66, 070	205, 005	431, 700
Haddock fillets	3, 969, 905	2, 498, 276	842, 528	1, 485, 712	2, 345, 797	4, 003, 329
Halibut (all trade sizes)	5, 274, 682	3, 670, 527	1, 316, 381	3, 166, 601	5, 356, 692	8, 268, 695
Herring, sea (including alewives and bluebacks)	1, 476, 051	1, 058, 571	750, 075	652, 215	759, 208	2, 005, 918
Lake trout	525, 685	309, 617	119, 065	21, 638	61, 438	253, 229
Mackerel (except Spanish)	5, 109, 252	3, 105, 029	1, 641, 387	391, 909	724, 908	2, 551, 375
Pike, blue and sauger	620, 071	527, 809	357, 586	63, 236	188, 478	466, 963
Pike, yellow or wall-eyed	284, 360	330, 087	182, 111	30, 327	94, 624	137, 875
Pike (including pickerel, jacks, and yellow jack)	113, 467	133, 130	76, 902	43, 165	49, 140	70, 055
Sablefish (black cod)	599, 477	427, 515	211, 539	142, 904	122, 868	123, 954
Salmon, chinook or king	1, 285, 970	824, 410	492, 180	365, 159	282, 645	690, 480
Salmon, silver or coho	2, 792, 142	2, 019, 708	1, 095, 756	512, 573	380, 110	335, 193
Salmon, fall and pink	1, 942, 287	1, 574, 257	768, 515	420, 331	289, 664	210, 165
Salmon, steelhead trout	90, 853	73, 236	91, 245	40, 829	26, 820	31, 042
Salmon, red or sockeye	322, 576	340, 751	190, 101	85, 240	91, 908	84, 964
Scup (porgies)	99, 684	57, 535	29, 935	12, 330	17, 070	66, 291
Shad and shad roe	422, 968	342, 601	220, 277	172, 416	194, 882	254, 410
Shellfish	1, 405, 491	1, 495, 595	897, 941	647, 734	958, 859	1, 715, 913
Smelts, eulachon, etc	197, 488	195, 987	278, 360	715, 978	759, 972	728, 419
Squid	303, 583	316, 229	145, 598	19, 257	120, 060	1, 058, 728
Sturgeon and spoonbill cat	314, 920	291, 663	241, 678	228, 001	231, 858	217, 946
Suckers	108, 457	84, 067	64, 253	64, 325	57, 579	58, 833
Swordfish	(1)	(1)	(1)	(1)	(1)	(1)
Weakfish (including southern "sea trout")	423, 562	169, 040	65, 979	13, 352	53, 832	181, 754
Whitefish	2, 310, 132	1, 939, 230	1, 782, 456	1, 350, 699	856, 904	669, 451
Whiting	4, 001, 716	3, 195, 417	1, 743, 144	955, 491	584, 700	2, 625, 704
Miscellaneous fish	5, 397, 092	4, 141, 934	2, 920, 166	2, 445, 812	3, 486, 461	4, 307, 418
Total	44, 660, 089	32, 522, 580	18, 513, 307	15, 839, 477	20, 552, 673	34, 673, 694

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	140, 448	136, 854	354, 900	597, 722	625, 946	545, 159
Butterfish (all trade sizes)	1, 749, 139	1, 681, 421	1, 657, 817	1, 539, 856	1, 692, 903	1, 525, 528
Catfish	261, 462	245, 094	137, 694	103, 510	92, 757	132, 455
Cisco (Lake Erie)	16, 711	12, 395	40, 510	36, 847	64, 184	95, 855
Cisco (lake herring), including bluefin, blackfin, and chub	291, 624	379, 590	415, 797	396, 849	693, 534	1, 265, 551
Cisco (tullibees, Canadian lakes)	57, 059	54, 592	55, 908	48, 407	103, 904	99, 679
Cod, haddock, hake, and pollock	1, 727, 992	2, 184, 510	2, 107, 851	1, 882, 282	2, 184, 578	4, 085, 788
Croaker	914, 255	1, 778, 993	2, 031, 389	1, 891, 546	1, 742, 526	1, 683, 081
Flounders	584, 414	561, 934	502, 499	500, 415	455, 600	529, 149
Haddock fillets	5, 597, 808	6, 722, 941	7, 361, 420	7, 455, 512	5, 909, 730	6, 279, 045
Halibut (all trade sizes)	11, 114, 912	13, 222, 506	13, 320, 852	12, 400, 438	11, 248, 326	8, 570, 018
Herring, sea (including alewives and bluebacks)	2, 773, 434	2, 762, 334	2, 771, 868	2, 735, 448	2, 837, 854	2, 804, 759
Lake trout	432, 104	487, 162	550, 718	692, 139	1, 122, 797	1, 140, 365
Mackerel (except Spanish)	4, 372, 729	5, 768, 678	10, 397, 860	10, 811, 789	9, 093, 138	7, 521, 288
Pike, blue and sauger	466, 145	328, 872	346, 096	358, 547	634, 681	948, 068
Pike, yellow or wall-eyed	143, 939	147, 177	186, 143	205, 690	235, 031	207, 216
Pike (including pickerel, jacks, and yellow jack)	67, 647	59, 433	74, 472	104, 676	187, 444	135, 199
Sablefish (black cod)	137, 436	150, 405	246, 857	898, 272	1, 335, 467	1, 172, 722
Salmon, chinook or king	952, 369	1, 503, 513	2, 395, 376	3, 008, 740	3, 063, 309	2, 639, 033
Salmon, silver or coho	677, 532	2, 487, 800	5, 318, 894	6, 522, 560	6, 327, 374	5, 008, 229
Salmon, fall and pink	155, 319	156, 263	262, 923	725, 372	2, 442, 579	2, 153, 270
Salmon, steelhead trout	233, 995	551, 561	666, 787	789, 863	698, 706	621, 397
Salmon, red or sockeye	93, 517	80, 956	76, 129	179, 729	148, 165	131, 961
Scup (porgies)	220, 365	338, 286	386, 627	378, 993	358, 357	293, 593
Shad and shad roe	521, 207	528, 013	522, 927	448, 217	429, 943	380, 040
Shellfish	1, 726, 733	1, 588, 857	1, 643, 845	1, 921, 011	2, 378, 099	2, 258, 407
Smelts, eulachon, etc	643, 794	657, 122	679, 385	701, 844	696, 604	742, 506

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[1] Prior to July 15. 1934. swordfish were included with "Miscellaneous fish."

Holdings of frozen fishery products, 1934—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Squid	1, 156, 956	1, 142, 375	995, 577	1, 011, 554	891, 434	898, 398
Sturgeon and spoonbill cat	187, 298	199, 293	205, 369	254, 096	451, 766	509, 050
Suckers	59, 576	67, 970	20, 663	19, 724	20, 668	17, 154
Swordfish	18, 013	190, 344	367, 688	401, 987	351, 616	531, 888
Weakfish (including southern "sea trout")	367, 007	566, 275	679, 894	849, 950	983, 096	802, 303
Whitefish	705, 381	961, 263	1, 087, 851	1, 127, 398	1, 118, 178	969, 288
Whiting	7, 421, 992	8, 835, 306	8, 851, 058	8, 417, 392	7, 613, 369	7, 126, 793
Miscellaneous fish	4, 786, 663	6, 060, 937	6, 915, 639	7, 732, 494	8, 892, 235	10, 025, 865
Total	50, 776, 975	62, 601, 025	73, 637, 283	77, 150, 809	77, 125, 898	73, 850, 100

BY GEOGRAPHICAL SECTIONS AND MONTHS[2]

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific[3]	Total
January	14, 870	9, 780	1, 418	5, 263	2, 064	412	10, 853	44, 660
February	9, 888	7, 996	980	4, 061	1, 765	308	7, 525	32, 523
March	4, 568	6, 093	641	2, 482	1, 340	346	3, 043	18, 513
April	3, 531	4, 276	421	1, 929	1, 228	205	4, 249	15, 839
May	4, 260	4, 404	1, 206	2, 553	1, 424	269	6, 437	20, 553
June	11, 413	6, 166	1, 375	3, 864	1, 614	289	9, 953	34, 674
July	21, 798	7, 773	1, 716	4, 023	1, 651	409	13, 407	50, 777
August	26, 443	8, 544	2, 953	4, 342	1, 882	395	18, 042	62, 601
September	30, 736	9, 494	3, 348	5, 771	1, 858	406	22, 024	73, 637
October	29, 144	10, 704	3, 213	7, 560	2, 286	585	23, 659	77, 151
November	25, 551	12, 341	3, 113	9, 014	2, 603	588	23, 916	77, 126
December	25, 865	12, 203	3, 152	9, 985	3, 016	611	19, 018	73, 850
Average	17, 339	8, 315	1, 961	5, 070	1, 894	402	13, 511	48, 492

[2] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; and Pacific—Washington, Oregon, California, and Alaska.

[3] Includes a small amount of fish held in Colorado in the Mountain section.

COLD STORAGE HOLDINGS OF CURED FISH

During 1934 monthly cold storage holdings of cured herring and mild-cured salmon averaged 13,826,000 pounds, which is a decrease of 7 percent as compared with the average monthly holdings in 1933. The holdings during October were largest, amounting to 16,916,880 pounds, and the smallest were in March, amounting to 10,553,839 pounds.

Holdings of cured fish, 1934, by species and months

Month ended the 15th of—	Cured herring	Mild-cured salmon	Total
	Pounds	*Pounds*	*Pounds*
January	12, 476, 109	3, 715, 280	16, 191, 389
February	10, 697, 263	2, 735, 627	13, 432, 890
March	8, 621, 167	1, 932, 672	10, 553, 839
April	9, 555, 517	1, 934, 289	11, 489, 806
May	10, 680, 368	1, 393, 382	12, 073, 750
June	11, 217, 038	1, 510, 220	12, 727, 258
July	10, 358, 795	2, 283, 797	12, 642, 592
August	9, 662, 858	4, 195, 014	13, 857, 872
September	9, 555, 150	5, 937, 916	15, 493, 066
October	10, 680, 436	6, 236, 444	16, 916, 880
November	9, 863, 391	6, 026, 180	15, 889, 571
December	8, 957, 644	5, 683, 957	14, 641, 601

FOREIGN FISHERY TRADE

The foreign trade in fishery products of the United States in 1934 amounted to $44,611,776, of which $30,789,995 represents the value of these products imported for consumption, and $13,821,781, the value of exports of domestic fishery products. Compared with the previous year, there was an increase of 15 percent in total trade, 1 percent in the value of the imports, and 66 percent in the value of exports.

Imports consisted of 286,763,407 pounds of edible products, valued at $23,174,248, and nonedible products, valued at $7,615,747. Fishery exports consisted of 115,702,334 pounds of edible products, valued at $12,002,686, and nonedible products, valued at $1,819,781.

Exports of domestic fishery products, 1934

Item	Quantity	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh, frozen, or packed in ice:		
Salmon .... pounds	7, 928, 249	$764, 906
Other .... do	2, 847, 861	224, 519
Total .... do	10, 776, 110	989, 425
Fish, salted, smoked, or dry cured:		
Cod .... do	589, 086	58, 834
Salmon .... do	513, 529	73, 140
Other .... do	1, 043, 450	66, 451
Total .... do	2, 146, 065	198, 425
Fish, pickled:		
Salmon .... do	1, 550, 800	296, 499
Other .... do	548, 000	29, 660
Total .... do	2, 098, 800	326, 159
Fish, canned:		
Mackerel .... do	4, 703, 566	218, 894
Salmon .... do	49, 065, 899	6, 676, 178
Sardines .... do	33, 145, 553	1, 937, 431
Other .... do	1, 278, 380	185, 250
Total .... do	88, 193, 398	9, 017, 753
Shellfish, not canned:		
Oysters, fresh, in the shell .... do	3, 293, 227	108, 653
Oysters, fresh, shucked, frozen, or in ice .... do	1, 534, 971	185, 072
Shrimp, fresh, frozen, or in ice .... do	1, 521, 785	157, 314
Shrimp, dried .... do	1, 647, 865	268, 829
Other shellfish, fresh, frozen, in ice, or dried .... do	225, 468	20, 729
Total .... do	8, 223, 316	740, 597
Shellfish, canned .... do	4, 009, 702	652, 243
Other fish products .... do	254, 943	78, 084
Total edible products .... do	115, 702, 334	12, 002, 686
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils .... do	6, 363, 891	193, 955
Sponges .... do	82, 661	93, 143
Fish meal for feed .... tons	27, 230	1, 172, 204
Oyster shells .... do	51, 205	359, 793
Total nonedible products		1, 819, 095
Grand total		13, 821, 781

Imports of fishery products entered for consumption, 1934

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh or frozen:		
Whole, beheaded, or eviscerated or both:		
Salmon	5, 658, 262	$533, 291
Fresh-water fish, not elsewhere specified:		
Yellow pike	8, 348, 967	653, 477
Whitefish	10, 016, 034	945, 164
Tullibees	1, 084, 439	43, 904
Jacks or grass pike	2, 043, 208	108, 749
Lake trout	2, 749, 277	247, 167
Yellow perch	4, 159, 563	221, 193
Lake herring, ciscoes and chubs	1, 160, 911	120, 745
Fresh-water fish, not elsewhere specified	15, 097, 097	1, 024, 028
Eels	487, 127	22, 418
Cod, haddock, hake, pollock, and cusk	1, 941, 557	84, 644
Halibut:		
Fresh	2, 418, 997	241, 663
Frozen	368, 398	29, 977
Mackerel	238, 880	12, 677
Swordfish	2, 950, 484	334, 933
Sturgeon	1, 744, 458	254, 351
Fish, not specially provided for	2, 544, 321	109, 980
Whether or not whole:		
Smelts	5, 271, 722	624, 464
Tuna fish	6, 093, 459	413, 476
Sea herring:		
Fresh	36, 117, 818	229, 351
Frozen	2, 079, 890	60, 530
Fillets, skinned, boned, sliced, or divided, not specially provided for	3, 942, 094	467, 749
Total	116, 516, 963	6, 783, 931
Fish, salted, dried, smoked, pickled, or preserved:		
Dried and unsalted:		
Cod, haddock, hake, pollock, and cusk	40, 098	3, 523
Other	3, 666, 965	398, 711
In oil or in oil and other substances:		
Sardines	22, 692, 650	2, 597, 447
Anchovies	1, 894, 968	599, 914
Antipasto	211, 972	78, 613
Tuna	8, 266, 196	1, 277, 417
Other	339, 822	52, 838
Not in oil or in oil and other substances:		
In airtight containers weighing, with contents, not over 15 pounds each:		
Anchovies	2, 246, 114	232, 450
Salmon	220, 465	17, 983
Herring and sardines	6, 496, 360	485, 447
Fish cakes, balls, and pudding	1, 650, 803	117, 623
Other	2, 048, 720	239, 848
Pickled or salted:		
Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each:		
Salmon	1, 220, 561	182, 235
Cod, haddock, hake, pollock, and cusk, neither skinned nor boned (except that vertebral column may be removed):		
Containing not more than 43 percent moisture by weight	6, 303, 454	342, 219
Containing more than 43 percent moisture by weight	34, 451, 703	1, 368, 126
Cod, haddock, hake, pollock and cusk, skinned or boned	2, 381, 563	188, 860
Herring:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	31, 807, 838	1, 593, 158
In containers (not airtight), weighing, with contents, not more than 15 pounds each	250	27
Mackerel:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	3, 848, 037	188, 901
Pickled or salted, not specially provided for:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	1, 166, 007	79, 643
In containers (not airtight) weighing, with contents, not more than 15 pounds each	2, 979	518
Smoked or kippered:		
Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each:		
Salmon	4, 463	1, 652
Herring:		
Whole or beheaded	892, 535	34, 722
Eviscerated, split, skinned, boned or divided	751, 413	70, 592
Cod, haddock, hake, pollock, and cusk:		
Whole, or beheaded, or eviscerated or both	717, 720	67, 223
Filleted, skinned, boned, sliced, or divided	1, 110, 517	118, 810
Smoked or kippered, not specially provided for	28, 699	1, 819

Imports of fishery products entered for consumption, 1934—Continued

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS—continued		
Fish, salted, dried, smoked, pickled, or preserved—Continued.		
Fish paste and fish sauce	75, 452	$24, 326
Prepared or preserved, not specially provided for:		
In containers weighing, with contents, not more than 15 pounds each	66, 283	8, 934
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	152, 184	11, 770
Total	134, 756, 791	10, 385, 349
Caviar and other fish roe:		
Not boiled, etc.:		
Sturgeon	267, 521	264, 705
Fish roe, not specially provided for	88, 852	12, 694
Boiled, packed in airtight containers	60, 434	6, 173
Total	416, 807	283, 572
Shellfish:		
Crab meat, crab sauce, and crab paste	7, 382, 142	2, 238, 757
Clams, clam juice, or either in combination with other substances, in airtight containers	1, 401, 757	171, 409
Oysters, oyster juice, or either in combination with other substances in airtight containers	111, 132	32, 888
Lobsters (including spiny lobsters and crawfish):		
Not canned	10, 158, 388	1, 894, 931
Canned	918, 293	469, 279
Clams not in airtight containers	1, 512, 721	25, 567
Shrimp and prawn	893, 599	111, 254
Scallops	867, 576	131, 360
Oysters, not in airtight containers	7, 435, 025	223, 884
Shellfish, not specially provided for	3, 919, 713	386, 817
Pastes and sauces of shellfish, not specially provided for	125, 691	14, 403
Crabs	4, 106	432
Turtles	342, 703	20, 415
Total	35, 072, 846	5, 721, 396
Total edible fishery products	286, 763, 407	23, 174, 248
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils:	*Quantity*	
Cod oil gallons	1, 458, 635	390, 860
Cod-liver oil do	3, 470, 259	2, 190, 985
Eulachon oil do	888	444
Halibut-liver oil do	1, 624	42, 563
Herring oil do	218, 483	33, 092
Seal oil do	34, 260	9, 493
Sod oil do	70, 940	15, 226
Whale oil:		
Sperm, crude do	505, 025	117, 897
Sperm, refined or otherwise processed do	53, 220	21, 067
Whale oil, not specially provided for do	2, 107, 078	865, 220
Marine-animal oils, not specifically provided for do	124, 896	91, 622
Total do	8, 045, 308	3, 778, 469
Pearls and imitation pearls:		
Pearls and parts, not strung or set	----------	477, 018
Imitation pearls, half pearls and hollow or filled	----------	14, 934
Imitation pearl beads:		
Hollow or filled	----------	30, 139
Solid iridescent, valued at not more than 10 cents per inch inches	800	45
Other solid imitation pearl beads:		
Valued at not more than ¼ cent per inch do	82, 553, 375	59, 485
Valued at more than ¼, but not more than 1 cent per inch do	151, 516	533
Valued at more than 1 but not more than 5 cents per inch do	19, 768	250
Total	----------	582, 404
Shells and buttons of pearl or shell:		
Shells, unmanufactured:		
Green snail shell pounds	289, 286	31, 729
Mother-of-pearl do	3, 840, 436	875, 698
Shells, not specially provided for do	4, 880, 861	64, 775
Shells and mother-of-pearl, engraved, cut, ornamented, or manufactured	----------	53, 407
Shell pearl buttons:		
Ocean or trochus gross	220, 378	68, 282
Fresh water do	5, 005	1, 289
Buttons (from Philippine Islands) do	637, 555	235, 117
Total	----------	1, 330, 297

Imports of fishery products entered for consumption, 1934—Continued

Item	Quantity	Value
NONEDIBLE FISHERY PRODUCTS—continued		
Sponges:		
Sheepswool pounds	130,980	$211,164
Yellow, grass, or velvet do	285,992	88,645
Other do	58,776	85,988
Manufactures of do	3,559	1,933
Total do	479,307	387,730
Agar-agar do	465,326	156,304
Ambergris do	30	3,586
Cod-liver oil cake and cod-liver oil cake meal do	1,409,412	35,412
Cuttlefish bone do	308,876	47,098
Goldfish, live number	524,294	5,093
Fish for other than human consumption, not elsewhere specified		119,843
Fish sounds pounds	165,413	27,096
Fish scrap and fish meal tons	35,624	996,358
Isinglass		29,961
Kelp pounds	6,916	124
Skins, fish, raw or salted do	726,531	36,532
Skins, seal, raw (not fur skins) do	490,838	61,553
Spermaceti wax do	137,438	17,103
Whalebone, unmanufactured do	466	168
Whalebone, manufactures of		616
Total		1,536,847
Total, nonedible fishery products		7,615,747
Grand total		30,789,995

FISHERIES OF THE NEW ENGLAND STATES

(AREA XXII)[5]

The most recent complete fishery statistics for the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) are those collected for the year 1933. In that year the yield of the commercial fisheries amounted to 499,936,139 pounds, valued at $13,485,550 to the fishermen, representing an increase of 4 percent in volume, but a decrease of 4 percent in value as compared with the catch of the previous year. Detailed statistics of these fisheries for 1933 appear in "Fishery industries of the United States, 1934" Appendix II to the Report of the United States Commissioner of Fisheries, 1935. A summary of these fisheries as well as statistics of the vessel fisheries at the principal New England ports for 1934 and the mackerel fishery of the Atlantic coast for 1934 appear in the following tables.

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[5] This is the number given this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area craft whose principal fishing ports are in the area but at times fish elsewhere. Notable examples are the ground fish fishery in area XXI and the mackerel and southern trawl fisheries in areas XXIII and XXIV. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the New England States, 1933

OPERATING UNITS: BY STATES

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	443		3,971	328	307	5,049
On boats and shore:						
Regular	3,748	48	2,781	371	360	7,308
Casual	1,841	52	1,652	677	494	4,716
Total	6,032	100	8,404	1,376	1,161	17,073
Vessels:						
Steam			13	8	3	24
Net tonnage			2,097	201	581	2,879
Motor	73		365	65	67	570
Net tonnage	856		13,995	695	1,056	16,602
Sail	1					1
Net tonnage	47					47
Total vessels	74		378	73	70	595
Total net tonnage	903		16,092	896	1,637	19,528
Boats:						
Motor	2,342	34	1,478	433	294	4,581
Other	1,396	17	1,624	506	276	3,819
Accessory boats	172		942	74	39	1,227
Apparatus:						
Purse seines:						
Mackerel	25		97	2		124
Length, yards	6,648		45,720	420		52,788
Other	51		2	1		54
Length, yards	7,040		260	400		7,700
Haul seines	31	1	15	20	12	79
Length, yards	3,100	35	1,655	2,512	1,668	8,970
Gill nets:						
Anchor	1,736	4	704		2	2,446
Square yards	556,491	2,160	280,655		1,680	840,986
Drift	709		4,105	44	43	4,901
Square yards	230,396		1,530,960	17,800	12,360	1,791,516
Runaround			1			1
Square yards			1,800			1,800
Lines:						
Hand	5,089	116	505	248	405	6,363
Hooks	5,259	116	671	319	443	6,808
Trawl	24,134	260	47,836	51	800	73,081
Hooks	1,155,574	13,000	2,380,062	24,700	35,680	3,609,016
Troll			8	48		56
Hooks			8	48		56
Trot with hooks	16			1		17
Hooks	1,600			200		1,800
Pound nets	3		86	64	9	162
Floating traps	21		17	40		78
Weirs	213		4			217
Fyke nets	56		24	37	4	121
Dip nets	124		130		119	373
Bag nets	112	30				142
Push nets			50			50
Pocket nets	2					2
Otter trawls	50		366	61	89	56
Yards at mouth	1,235		21,084	1,635	2,373	26,32
Box traps	13		3			16
Pots:						
Crab	2,296		1,095			3,391
Eel	222		1,565	1,698	1,289	4,77
Lobster	180,439	2,990	65,147	53,672	17,212	319,46
Periwinkle and cockle			935	1,585		2,52
Harpoons	43		126	36	16	22
Spears	26		185	13	42	26
Dredges:						
Oyster			34	30	43	10
Yards at mouth			44	45	65	15
Scallops	155		2,038	374	2	2,56
Yards at mouth	231		1,895	324	7	2,45
Clam			63	12		7
Yards at mouth			31	9		4
Mussel				1		
Yards at mouth				1		
Tongs			166	543	118	82
Rakes			654	75	71	80
Forks			945	8		95
Hoes	1,605		260	26	38	1,92

Fisheries of the New England States, 1933—Continued

CATCH: BY STATES[1]

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,703,078	$6,371			923,056	$8,399	176,000	$1,915	15,162	$152	2,817,296	$16,837
Amberjack					2,275	68					2,275	68
Bluefish	85	11			430,040	42,882	194,386	10,806	296,454	22,058	920,965	75,757
Bonito					5,222	233	46,322	1,923			51,544	2,156
Butterfish	99,475	5,059			951,585	45,905	486,522	16,204	15,941	764	1,553,523	67,932
Cod	9,336,894	145,484	28,602	$858	89,210,361	1,688,460	908,241	16,735	147,925	4,457	99,632,023	1,855,994
Crevalle							2,200	81			2,200	81
Croaker					2,491,145	35,716			5,738	136	2,496,883	35,852
Cunners	175	5			152	2	41,440	451			41,767	458
Cusk	1,583,366	18,342	17,161	343	4,509,004	53,766					6,109,531	72,451
Drum:												
Black					32	1			100	1	132	2
Red					1,755	32					1,755	32
Eels:												
Common	102,025	8,028			222,279	10,727	145,611	12,113	47,394	3,964	517,309	34,832
Conger					38,617	733	958	29	1,400	120	40,975	882
Flounders	1,178,669	27,517			27,187,427	878,601	3,253,077	90,930	6,176,038	175,968	37,795,211	1,173,016
Frigate mackerel					68,799	2,752	56,654	1,609			125,453	4,361
Grayfish	316	7			12,512	132	600	12			13,428	151
Haddock	9,306,555	215,744	60,063	2,703	150,680,476	3,425,852	23,968	703	35,450	1,018	160,106,512	3,646,020
Hake	7,084,013	66,270	168,749	2,531	8,056,678	133,691	9,171	183	1,081	20	15,319,692	202,695
Halibut	50,011	4,776			2,401,292	230,469			6,063	310	2,457,366	235,555
Herring, sea	43,774,988	160,816	2,000	20	3,572,960	38,784	737,006	11,467			48,086,954	211,087
Herring smelt					11,648	313					11,648	313
Hickory shad							2,308	23			2,308	23
King whiting or "kingfish"					38,296	1,035	1,440	53	451	12	40,187	1,100
Launce					21,000	420					21,000	420
Mackerel	4,499,107	57,740	1,050	53	35,611,363	798,108	719,289	22,137	870	27	40,831,679	878,065
Menhaden					334	4	1,003,510	2,535	25,250	252	1,029,094	2,791
Mullet					10	1	8,811	321			8,821	322
Pigfish					3,832	73					3,832	73
Pollock	3,006,065	23,414	11,441	114	11,991,798	140,076	17,242	451			15,026,546	164,055
Rosefish	2,063	14			262,255	2,827					264,318	2,841
Salmon	24,644	6,269			45	9					24,689	6,278
Scup or porgy					2,133,410	50,068	2,019,431	37,433	41,987	1,659	4,194,828	89,160
Sea bass					3,923,089	117,321	48,265	2,543	27,615	1,843	3,998,969	121,707
Sea robin					400	8	73,785	697	3,250	33	77,435	738
Shad	178,901	1,834			62,751	1,986	10,760	1,138	133,280	10,969	385,692	15,927

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[1] Excluding seed oyster fishery. The seed oyster fishery in this section was prosecuted in Rhode Island and Connecticut where 258 fishermen, using 23 vessels, 7 motorboats 90 other boats, 101 dredges, 96 tongs, and 46 rakes, took 74,621 bushels of seed oysters, valued at $29,949, from public beds, and 207,185 bushels, valued at $69,617 from private beds. Of the total number of persons fishing for seed oysters 135 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 78 boats other than motor, 82 tongs, and 46 rakes.

Fisheries of the New England States, 1933—Continued

CATCH: By States—Continued

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued												
Sharks	29,923	$230			34,148	$287	1,947	$28			66,018	$545
Sheepshead					9	1					9	1
Skates	7,981	115			37,256	479	176,410	1,328	18,550	$185	240,197	2,107
Skipper or "billfish"					4,110	41	730	14			4,840	55
Smelt	529,990	56,827	14,267	$2,140			4,250	425	2,240	224	550,747	59,616
Spot					32,743	376	45	1	50	1	32,838	378
Squeteagues or "sea trout":												
Gray					286,547	8,543	63,310	4,012	19,510	1,736	369,367	14,291
Spotted					2,048	204					2,048	204
Striped bass					19,957	3,932	39,232	2,418	2,250	225	61,439	6,575
Sturgeon	2,308	224			5,130	639	449	37	44	5	7,931	905
Suckers	50,518	1,502							1,000	60	51,518	1,562
Swordfish	323,939	39,381			2,643,512	324,817	259,710	23,799	154,235	16,650	3,381,396	404,647
Tautog					173,543	6,766	267,123	7,402	43,098	1,895	483,764	16,063
Thimble-eyed mackerel							77,707	1,533			77,707	1,533
Tilefish									207,000	10,330	207,000	10,330
Tomcod	1,964	51					200	1			2,164	52
Tuna or "horse mackerel"	100,532	2,069			256,372	14,016	44,577	1,484			401,481	17,569
White perch					48,786	7,109	861	42			49,647	7,151
Whiting					8,677,742	88,648	724,506	7,626	16,775	547	9,419,023	96,821
Wolffish	93,647	482	3,142	79	2,096,569	31,334			4,100	41	2,197,458	31,936
Yellow perch	534	80									534	80
Total	83,071,766	848,662	306,475	8,841	359,144,370	8,196,646	11,648,054	282,642	7,450,301	255,662	461,620,966	9,592,453
SHELLFISH, ETC.												
Crabs:												
Hard	501,666	15,126			5,106,515	24,795	20,478	369	400	25	5,629,059	40,315
King							6,574	18			6,574	18
Lobsters	5,897,685	1,000,094	216,929	48,230	1,928,616	381,649	708,095	113,933	336,800	64,135	9,088,125	1,608,041
Shrimp					41,200	2,170					41,200	2,170
Periwinkles and cockles	15,516	825			65,700	6,350	109,442	5,201			190,658	12,376
Clams:												
Hard, public [2]	11,594	1,054			1,766,525	215,048	1,068,891	125,047	101,605	20,735	2,948,615	361,884
Hard, private [2]					2,200	400	89,045	12,249			91,245	12,649
Razor					358,400	15,874					358,400	15,874
Soft, public [3]	6,548,620	224,005			2,836,090	245,469	32,384	4,214	13,683	1,953	9,430,777	475,641
Surf or skimmer					59,240	3,575					59,240	3,575
Mussels, sea	110,596	2,534			30,000	3,000	650	38			141,246	5,572
Oysters: [4]												
Market, public, spring							26,880	3,840	10,150	1,250	37,030	5,090
Market, public, fall							38,444	5,507	11,550	1,450	49,994	6,957

Market, private, spring	----------	----------	----------	----------	75, 161	25, 680	1, 525, 384	211, 748	613, 547	51, 383	2, 214, 092	318, 811
Market, private, fall	----------	----------	----------	----------	105, 448	34, 357	1, 527, 055	211, 897	1, 223, 661	170, 261	2, 856, 164	416, 515
Scallops:												
Bay	----------	----------	----------	----------	500, 115	180, 975	63, 120	12, 943	57, 500	10, 000	620, 735	203, 918
Sea	1, 073, 172	145, 884	----------	----------	1, 029, 097	115, 344	----------	----------	55, 926	6, 226	2, 158, 195	267, 454
Squid	203	2	----------	----------	570, 536	7, 564	501, 851	11, 618	2, 905	50	1, 075, 495	19, 234
Irish moss	----------	----------	----------	----------	11, 650	582	----------	----------	----------	----------	11, 650	582
Bloodworms	642, 852	42, 724	----------	----------	17, 759	28, 000	----------	----------	----------	----------	660, 611	70, 724
Sandworms	618, 567	25, 980	----------	----------	21, 656	19, 500	----------	----------	----------	----------	640, 223	45, 480
Sea urchins	5, 845	217	----------	----------	----------	----------	----------	----------	----------	----------	5, 845	217
Total	15, 426, 316	1, 458, 445	216, 929	48, 230	14, 525, 908	1, 510, 332	5, 718, 293	718, 622	2, 427, 727	357, 468	38, 315, 173	3, 893, 097
Grand total	98, 498, 082	2, 307, 107	523, 404	57, 071	373, 670, 278	9, 506, 978	17, 366, 347	1, 001, 264	9, 878, 028	613, 130	499, 936, 139	13, 485, 550

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[2] Statistics on hard clams used in this table are based on yields of 11 pounds of meats per bushel in Maine, Massachusetts, and Rhode Island, and 10 pounds in Connecticut.

[3] Statistics on soft clams in this table are based on yields of 15 pounds of meats per bushel in Maine and Massachusetts, 16 pounds in Rhode Island, and 14 pounds in Connecticut.

[4] Statistics on oysters used in this table are based on yields of 6.57 pounds of meats per bushel in Massachusetts, 6.96 pounds in Rhode Island, and 6.81 pounds in Connecticut.

NOTE.—Of the total catch in Massachusetts, 10,619,503 pounds of fishery products, valued at $281,810, were taken in the southern winter trawl fishery off southern New Jersey, Maryland, Virginia, and North Carolina. Of the total catch in Connecticut, 111,837 pounds of fishery products, valued at $4,641, were taken in the same fishery. These products consisted principally of croaker, flounders, scup, and sea bass.

Industries related to the fisheries of the New England States

OPERATING UNITS, SALARIES, AND WAGES, 1933

Item	Maine and New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	149	43	8	56	256
On boats	16	--------	38	--------	54
Total	165	43	46	56	310
Vessels:					
Steam	--------	--------	--------	1	1
Net tonnage	--------	--------	--------	67	67
Motor	74	12	4	14	104
Net tonnage	813	338	39	425	1,615
Total vessels	74	12	4	15	105
Total net tonnage	813	338	39	492	1,682
Boats	11	--------	20	--------	31
Wholesale and manufacturing:					
Establishments	131	165	35	31	362
Persons engaged:					
Proprietors	112	89	29	36	266
Salaried employees	142	587	35	35	799
Wage earners:					
Average for season	4,383	3,012	301	416	8,112
Average for year	1,298	2,336	207	329	4,170
Paid to salaried employees	$253,670	$1,291,380	$83,949	$85,198	$1,714,197
Paid to wage earners	$765,974	$2,382,013	$159,894	$387,994	$3,695,875
Total salaries and wages	$1,019,644	$3,673,393	$243,843	$473,192	$5,410,072
Fishermen manufacturing	612	1,480	109	22	2,223

PRODUCTS MANUFACTURED

Item	Maine		Massachusetts		Rhode Island		Connecticut	
BY MANUFACTURING ESTABLISHMENTS	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives: Salted, tight pack ... pounds	567,238	$9,669	(1)	(1)	--------	--------	--------	--------
Cod:								
Fresh sticks[2] ... do	209,283	24,374	--------	--------	--------	--------	--------	--------
Fresh fillets[2] ... do	90,605	9,813	6,586,030	$748,166	--------	--------	--------	--------
Frozen fillets[2] ... do	(1)	(1)	5,849,679	560,527	--------	--------	--------	--------
Salted:								
Green[3] ... do	734,166	28,885	593,764	29,648	--------	--------	--------	--------
Dry ... do	59,196	2,054	(1)	(1)	--------	--------	--------	--------
Boneless, including absolutely boneless ... pounds	131,175	16,333	6,312,775	1,189,945	--------	--------	--------	--------
Smoked fillets ... do	44,889	6,718	1,017,034	147,241	--------	--------	--------	--------
Oil, cod[2] ... gallons	5,150	1,482	45,982	20,667	--------	--------	--------	--------
Oil, cod liver[2] ... do	13,995	5,419	69,264	46,292	--------	--------	--------	--------
Cusk:								
Fresh sticks[2] ... pounds	327,546	36,219	--------	--------	--------	--------	--------	--------
Fresh fillets[2] ... do	47,200	5,029	372,833	49,218	--------	--------	--------	--------
Frozen fillets[2] ... do	(1)	(1)	80,122	5,292	--------	--------	--------	--------
Salted:								
Green[3] ... do	31,150	673	(1)	(1)	--------	--------	--------	--------
Boneless, including absolutely boneless ... pounds	(1)	(1)	23,785	2,762	--------	--------	--------	--------
Flounders:								
Fresh fillets[2] ... do	62,027	8,262	932,328	141,326	--------	--------	--------	--------
Frozen fillets[2] ... do	(1)	(1)	442,704	62,281	--------	--------	--------	--------
Haddock.								
Fresh fillets[2] ... do	121,764	20,482	15,129,191	1,734,320	--------	--------	--------	--------
Frozen fillets[2] ... do	20,414	1,886	19,206,008	1,740,253	--------	--------	--------	--------
Fresh steaks[2] ... do	61,312	11,194	(1)	(1)	--------	--------	--------	--------
Salted:								
Green[3] ... do	31,400	803	--------	--------	--------	--------	--------	--------
Boneless, including absolutely boneless ... pounds	--------	--------	98,295	19,220	--------	--------	--------	--------
Finnan haddie ... do	131,400	18,960	931,754	103,793	(1)	(1)	--------	--------

See footnotes at end of table.

Industries related to the fisheries of the New England States—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
BY MANUFACTURING ESTABLISHMENTS—con.								
Hake:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fresh fillets [2] pounds	147, 406	$13, 094	887, 216	$89, 005	--------	--------	--------	--------
Frozen fillets [2] do	(1)	(1)	155, 194	11, 512	--------	--------	--------	--------
Fresh steaks [2] do	326, 726	36, 244	--------	--------	--------	--------	--------	--------
Salted:								
Green [3] do	334, 123	10, 069	(1)	(1)	--------	--------	--------	--------
Dry do	(1)	(1)	271, 172	8, 723	--------	--------	--------	--------
Halibut, frozen, steaks [2] pounds	--------	--------	29, 124	6, 343	--------	--------	--------	--------
Herring, sea:								
Salted, round do	560, 700	11, 439	(1)	(1)	--------	--------	--------	--------
Smoked:								
Bloaters:								
Soft do	286, 662	10, 954	585, 332	52, 782	--------	--------	--------	--------
Hard do	259, 830	6, 952	(1)	(1)	--------	--------	--------	--------
Boneless do	1,953,365	187, 020	--------	--------	--------	--------	--------	--------
Lengthwise do	114, 915	9, 456	--------	--------	--------	--------	--------	--------
Medium scaled pounds	168, 370	14, 247	(1)	(1)	--------	--------	--------	--------
Kippered do	(1)	(1)	169, 505	17, 131	--------	--------	--------	--------
Canned "sardines" [2] standard cases	1,142,730	3,315,190	--------	--------	--------	--------	--------	--------
Scrap, dry [2] tons	1, 297	38, 122	--------	--------	--------	--------	--------	--------
Meal [2] do	1, 224	34, 741	--------	--------	--------	--------	--------	--------
Oil [2] gallons	61, 751	7, 780	--------	--------	--------	--------	--------	--------
Mackerel:								
Fresh fillets [2] pounds	--------	--------	55, 200	6, 604	--------	--------	--------	--------
Salted:								
Fillets do	(1)	(1)	1, 767, 746	133, 250	--------	--------	--------	--------
Split do	84, 420	2, 711	1, 285, 360	91, 823	--------	--------	--------	--------
Canned [2] standard cases	13, 228	66, 799	--------	--------	--------	--------	--------	--------
Pollock:								
Fresh fillets [2] pounds	--------	--------	1, 223, 280	96, 125	--------	--------	--------	--------
Frozen fillets [2] do	(1)	(1)	2, 968, 520	184, 966	--------	--------	--------	--------
Salted:								
Green [3] do	89, 055	1, 824	(1)	(1)	--------	--------	--------	--------
Dry do	42, 387	2, 004	941, 442	37, 115	--------	--------	--------	--------
Rosefish, fresh fillets [2] pounds	--------	--------	17, 760	2, 191	--------	--------	--------	--------
Wolffish:								
Fresh fillets [2] do	--------	--------	55, 800	6, 787	--------	--------	--------	--------
Frozen fillets [2] do	--------	--------	254, 830	24, 079	--------	--------	--------	--------
Crab meat, packaged, fresh cooked pounds	67, 441	33, 571	151, 087	62, 979	(1)	(1)	--------	--------
Lobster meat, packaged, fresh cooked pounds	--------	--------	79, 020	86, 420	--------	--------	--------	--------
Clams, hard, fresh shucked gallons	--------	--------	--------	--------	2, 660	$4, 815	(1)	(1)
Clams, soft:								
Fresh shucked do	--------	--------	--------	--------	12, 145	12, 083	--------	--------
Canned:								
Whole [2] standard cases	89, 787	321, 189	--------	--------	--------	--------	--------	--------
Chowder [2] standard cases	75, 088	244, 252	--------	--------	(1)	(1)	--------	--------
Juice and bouillon [2] standard cases	12, 804	35, 970	--------	--------	--------	--------	--------	--------
Marine-shell products, buttons [2] gross	(1)	(1)	--------	--------	--------	--------	1, 226, 731	$697, 001
Pearl essence [2] pounds	13, 305	99, 975	--------	--------	--------	--------	--------	--------
Oysters, fresh shucked gallons	--------	--------	--------	--------	301, 942	514, 470	175, 313	313, 445
Unclassified products:								
Packaged, fresh and frozen [2] pounds	[4] 283, 626	[4] 22, 674	[5] 3,530,334	[5] 335, 095	--------	--------	--------	--------
Salted do	[6] 31, 363	[6] 2, 639	[7] 1,601,189	[7] 103, 216	--------	--------	--------	--------
Smoked do	[8] 251, 757	[8] 25, 587	[9] 764, 708	[9] 151, 769	(10)	(10)	(10)	(10)
Canned:								
Fish cakes, flakes, etc. [2] standard cases	33, 145	264, 477	83, 107	684, 470	--------	--------	--------	--------
Other [2] do	[11] 554	[11] 3, 265	[12] 55, 164	[12] 267, 777	(10)	(10)	--------	--------

See footnotes at end of table.

Industries related to the fisheries of the New England States—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
BY MANUFACTURING ESTABLISHMENTS—con.								
Unclassified products—Continued.								
Meal, ground fish [2] tons	----------	----------	10,044	$476,704	----------	----------	----------	----------
Miscellaneous [13]	----------	[14]$135,809	----------	[15]1,059,116	----------	[16]$161,325	----------	[17]$138,21
Total	----------	5,166,309	----------	10,596,933	----------	692,693	----------	1,148,65
BY FISHERMEN								
Alewives:								
Corned pounds	----------	----------	80,000	4,800	----------	----------	----------	----------
Salted, tight pack pounds	263,100	439	420,000	12,600	----------	----------	----------	----------
Smoked do	165,085	4,848	12,000	600	----------	----------	----------	----------
Cod, salted:								
Green [3] do	----------	----------	403,778	11,087	----------	----------	----------	----------
Dry do	5,860	226	----------	----------	----------	----------	----------	----------
Cusk, dry salted do	620	11	2,714	52	----------	----------	----------	----------
Haddock, green salted [3] pounds	----------	----------	14,365	288	----------	----------	----------	----------
Hake, green salted [3] do	----------	----------	3,030	31	----------	----------	----------	----------
Hake, dry salted do	4,090	77	----------	----------	----------	----------	----------	----------
Halibut, green salted do	----------	----------	2,115	97	----------	----------	----------	----------
Mackerel, salted, split pounds	600	45	25,800	817	----------	----------	----------	----------
Pollock, green salted [3] pounds	----------	----------	90	1	----------	----------	----------	----------
Crabmeat, packaged, fresh cooked pounds	3,459	1,558	5,000	2,500	1,200	480	----------	----------
Clams, razor, fresh shucked gallons	----------	----------	36,078	17,729	----------	----------	----------	----------
Clams, soft:								
Fresh shucked do	70,281	48,225	19,000	24,000	50	75	500	1,000
Steamed pounds	161,887	11,279	----------	----------	----------	----------	----------	----------
Clams, surf or skimmer, fresh shucked gallons	----------	----------	5,922	4,050	----------	----------	----------	----------
Oysters, fresh shucked gallons	----------	----------	----------	----------	----------	----------	2,840	4,680
Scallops, bay, fresh shucked gallons	----------	----------	55,468	197,520	7,181	29,247	900	3,600
Scallops, sea, fresh shucked gallons	27,151	56,242	114,341	115,031	----------	----------	----------	----------
Total	----------	122,950	----------	391,203	----------	29,802	----------	9,280
Grand total	----------	5,289,259	----------	10,988,136	----------	722,495	----------	1,157,939

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[1] This item has been included under "Unclassified products."

[2] Data are for 1934.

[3] This item is usually an intermediate product and, although included in the total, may also be shown in its final stage of processing in this or another State.

[4] Includes frozen fillets of cod, cusk, flounders, hake, mackerel, and pollock.

[5] Includes fresh fillets of whiting; frozen fillets of mackerel, rosefish, salmon, and whiting; fresh steaks of cod, haddock, halibut, pollock, salmon, swordfish, and wolffish; frozen steaks of cod, salmon, swordfish, and wolffish; and frozen sticks of whiting.

[6] Includes dry-salted cusk, haddock, and hake; boneless cusk and hake; salted sea herring and mackerel fillets.

[7] Includes green-salted cusk, hake, and pollock; dry-salted cod, cusk, haddock, and tongues; boneless hake; salted alewives, tight pack; and salted sea herring, round and split.

[8] Includes finnan cod; smoked cusk, haddock, and hake fillets; kippered herring; and spiced sea herring.

[9] Includes smoked alewives, butterfish, carp, flounders, halibut, lake trout, mackerel, salmon, shad, and whitefish; smoked cusk, haddock, and hake fillets; sea herring, hard smoked, bloaters, and medium-scaled; spiced sea herring; and smoked and spiced salmon.

[10] This item is included with miscellaneous.

[11] Includes pickled soft clams; finnan haddie; and cat and dog food.

[12] Includes soft-clam chowder; finnan haddie; cat and dog food; hard-clam chowder; mackerel; deep-sea roe; and rat bait.

[13] Both 1933 and 1934 data are included in these items.

[14] Includes ground-fish meal; clam meal; and marine buttons.

[15] Includes ground-fish dry scrap; liquid glue; halibut liver oil; isinglass; marine-shell buttons and novelties; and mussel-shell novelties.

[16] Includes hard-clam chowder; marine-shell novelties; oyster-shell products; packaged fresh-cooked crab meat; fresh-shucked bay scallops; and finnan haddie.

[17] Includes fresh-shucked hard clams; smoked butterfish, carp, mackerel, paddlefish or spoonbill cat, salmon, and whitefish; and marine-shell novelties.

NOTE.—Unless otherwise indicated the data are for 1933. The total value of manufactured products for the New England States was as follows: By manufacturing establishments, $17,604,594; and by fishermen, $553,235. Some of the above products may have been manufactured from products imported from another State or country; therefore they cannot be correlated directly with the catch within the State.

VESSEL FISHERIES AT PRINCIPAL NEW ENGLAND PORTS

Due to the importance of the ports of Boston and Gloucester, Mass., and Portland, Maine, as landing points for fishery products, detailed monthly statistics are collected for these landings which are published in the following sections.

ECONOMIC ASPECT

The landings of fishery products at the three principal New England ports (Boston and Gloucester, Mass., and Portland, Maine), by vessels of 5 net tons capacity or more, during 1934 amounted to 299,915,821 pounds as landed, valued at $7,882,397. Of the total landings, 99 percent consisted of fresh fish and 1 percent salted fish. The landings at Boston accounted for 243,692,588 pounds, valued at $6,731,364, or 82 percent of the total volume; the landings at Gloucester amounted to 40,130,189 pounds, valued at $755,699, or 13 percent of the total; and the landings at Portland amounted to 16,093,044 pounds, valued at $395,334, or 5 percent of the total.

Among the landings of fresh fish, haddock far outranked other species in volume landed, the landings of all sizes in 1934 amounted to 127,763,681 pounds, or 43 percent of the total fresh fish.

Landings by fishing vessels at the three principal New England ports, 1934

BOSTON: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	1, 803, 170	$80, 432	3, 387, 435	$145, 131	4, 897, 495	$123, 398	3, 999, 540	$66, 902	2, 504, 443	$44, 962	1, 779, 005	$43, 513	2, 207, 275	$44, 108
Market	2, 346, 750	83, 103	1, 984, 345	81, 761	5, 212, 615	127, 581	4, 411, 920	72, 496	3, 038, 140	55, 574	3, 099, 610	68, 588	4, 035, 267	72, 930
Scrod	11, 640	292	2, 200	46	1, 100	27	2, 400	30	3, 625	79	6, 450	110	14, 350	189
Cod, salted:														
Large											25, 000	846	12, 500	450
Market											1, 500	45	3, 000	90
Haddock, fresh:														
Large	4, 265, 660	202, 510	5, 401, 560	253, 370	8, 322, 425	288, 945	9, 655, 892	200, 419	7, 708, 900	181, 387	6, 562, 965	179, 834	5, 320, 990	142, 647
Scrod	3, 619, 165	99, 968	3, 018, 370	96, 531	4, 199, 525	120, 780	5, 211, 430	80, 268	4, 407, 545	74, 858	4, 412, 145	86, 167	5, 142, 625	86, 740
Hake, fresh:														
Large	358, 189	14, 043	123, 290	6, 719	211, 950	9, 730	197, 345	4, 543	162, 775	3, 474	137, 200	3, 030	159, 050	2, 796
Small	28, 100	1, 119	4, 695	264	17, 800	881	141, 240	4, 628	13, 600	412	58, 500	1, 740	76, 450	1, 562
Hake, salted, large													4, 370	55
Pollock, fresh	504, 025	11, 714	569, 665	19, 734	457, 660	12, 188	695, 955	8, 931	421, 835	6, 026	218, 975	3, 695	332, 930	4, 977
Cusk, fresh	272, 330	7, 741	129, 330	3, 782	449, 970	9, 416	276, 640	3, 623	106, 670	1, 714	101, 575	1, 638	164, 675	2, 321
Halibut, fresh	51, 860	6, 874	144, 875	20, 268	215, 317	25, 970	146, 989	14, 987	225, 549	22, 169	129, 496	13, 633	172, 524	18, 731
Mackerel:														
Fresh							45, 410	3, 446	3, 211, 205	71, 814	2, 237, 830	65, 596	3, 325, 570	76, 061
Salted											1, 600	32	600	21
Flounders, fresh	859, 005	42, 004	401, 455	24, 703	889, 990	35, 941	1, 174, 890	30, 189	1, 219, 160	24, 881	1, 063, 145	25, 125	853, 945	22, 334
Swordfish, fresh											88, 325	17, 209	512, 627	101, 245
Other, fresh	116, 699	3, 240	329, 584	9, 773	720, 270	16, 432	538, 435	8, 850	666, 952	11, 610	610, 974	11, 570	605, 791	10, 338
Total, fresh	14, 236, 593	553, 040	15, 496, 804	662, 082	25, 596, 117	771, 289	26, 498, 086	499, 312	23, 690, 399	498, 960	20, 506, 195	521, 448	22, 924, 069	586, 979
Total, salted											28, 100	923	20, 470	616
Grand total	14, 236, 593	553, 040	15, 496, 804	662, 082	25, 596, 117	771, 289	26, 498, 086	499, 312	23, 690, 399	498, 960	20, 534, 295	522, 371	22, 944, 539	587, 595

NOTE.—The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. Large cod are classified as those weighing over 10 pounds; market cod, 2½ to 10 pounds; and scrod cod, 1 to 2½ pounds. Large haddock are those weighing over 2½ pounds and scrod haddock, 1 to 2½ pounds. Large hake are those weighing over 6 pounds and small hake, under 6 pounds. The statistics of the landings at Boston, have been revised from those previously published. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation.

Species	August		September		October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:												
Large	1, 398, 430	$42, 735	1, 805, 470	$56, 499	968, 782	$36, 996	1, 722, 388	$53, 002	2, 043, 742	$70, 052	28, 517, 675	$807, 730
Market	3, 109, 720	63, 993	2, 475, 170	63, 574	2, 193, 330	58, 860	3, 338, 535	84, 018	5, 299, 230	128, 582	40, 544, 632	961, 060
Scrod	10, 200	120	26, 745	532	47, 830	942	30, 325	704	72, 170	1, 352	229, 035	4, 423
Cod, salted:												
Large			9, 000	414	14, 000	626					60, 500	2, 336
Market			1, 500	52	3, 000	105	13, 700	103			22, 700	395
Haddock, fresh:												
Large	6, 401, 305	169, 351	4, 845, 095	170, 068	2, 687, 035	143, 933	3, 388, 690	141, 116	3, 716, 215	172, 064	68, 276, 732	2, 245, 644
Scrod	5, 563, 855	85, 943	5, 767, 085	108, 250	2, 637, 755	57, 903	2, 224, 277	57, 235	4, 278, 226	104, 599	50, 482, 003	1, 059, 242
Hake, fresh:												
Large	417, 870	7, 254	259, 423	6, 066	378, 230	12, 128	608, 470	14, 231	425, 095	11, 535	3, 438, 887	95, 549
Small	111, 750	2, 564	81, 700	2, 373	83, 700	3, 387	108, 800	3, 465	43, 520	1, 549	769, 855	23, 944
Hake, salted, large											4, 370	55
Pollock, fresh	240, 180	4, 575	268, 210	4, 621	191, 825	3, 497	3, 190, 016	43, 496	1, 607, 595	22, 183	8, 698, 871	145, 637
Cusk, fresh	264, 085	4, 068	120, 895	2, 203	202, 820	4, 782	284, 845	6, 011	239, 500	5, 208	2, 613, 335	52, 507
Halibut, fresh	117, 828	13, 091	194, 690	26, 770	128, 947	16, 689	73, 572	8, 173	44, 809	6, 371	1, 646, 456	193, 726
Mackerel, fresh	5, 743, 241	97, 071	5, 238, 140	72, 994	1, 176, 560	34, 000	24, 330	1, 561	50	5	21, 002, 336	422, 548
Mackerel, salted			800	24							3, 000	77
Flounders, fresh	766, 730	27, 786	787, 026	34, 601	635, 825	32, 754	1, 066, 225	34, 542	1, 052, 429	39, 410	10, 769, 825	374, 270
Swordfish, fresh	474, 850	76, 574	226, 457	42, 035	11, 836	3, 191					1, 314, 095	240, 254
Other, fresh	407, 719	7, 160	292, 133	6, 119	580, 578	7, 825	226, 815	5, 376	202, 331	3, 674	5, 298, 281	101, 967
Total, fresh	25, 027, 763	602, 285	22, 388, 239	596, 705	11, 925, 053	416, 887	16, 287, 788	452, 930	19, 024, 912	566, 584	243, 602. 018	6, 728, 501
Total, salted			11, 300	490	17, 000	731	13, 700	103			90, 570	2, 863
Grand total	25, 027, 763	602, 285	22, 399, 539	597, 195	11, 942. 053	417, 618	16, 301, 488	453, 033	19, 024, 912	566, 584	243, 692, 588	6, 731, 364

Landings by fishing vessels at the three principal New England ports, 1934—Continued

GLOUCESTER: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	249, 920	$12, 619	91, 645	$4, 040	954, 845	$27, 573	2, 561, 890	$56, 142	1, 950, 360	$42, 711	781, 415	$20, 342	464, 600	$8, 583
Market	13, 866	562	3, 245	118	46, 120	1, 014	736, 132	13, 246	495, 920	8, 378	483, 440	6, 511	444, 525	5, 584
Scrod	1, 455	36	240	6	1, 650	30			16, 330	257	505	4	1, 165	10
Cod, salted														
Large					3, 420	154	3, 900	137	77, 970	2, 340	11, 400	371	125, 899	4, 506
Market							600	15	29, 550	591	4, 080	92	108, 034	2, 711
Scrod													29, 132	437
Haddock, fresh:														
Large	27, 370	1, 757	24, 340	1, 395	84, 410	2, 727	706, 040	19, 628	598, 105	12, 135	232, 838	4, 350	238, 575	4, 856
Scrod	920	27	1, 245	35	10, 125	211	203, 505	3, 137	151, 680	2, 300	338, 417	4, 959	606, 500	7, 583
Hake, fresh:														
Large	23, 915	988	12, 600	600	10, 580	155	6, 635	126	12, 820	102	6, 490	89	26, 365	202
Small							250	5						
Pollock, fresh	218, 710	6, 935	27, 035	1, 019	6, 120	65	45, 255	680	67, 450	506	7, 355	69	23, 725	184
Pollock, salted														
Cusk, fresh	5, 250	125	7. 360	176	7, 960	144	50, 215	612	17, 955	133	6, 570	45	40, 900	300
Cusk, salted													700	14
Halibut, fresh	235	42	49	7	10	1			106	10				
Halibut, salted													4, 120	215
Mackerel, fresh									506, 465	7, 302	545, 820	8, 632	807, 440	11, 861
Mackerel, salted											34, 550	719	151, 270	5, 401
Flounders, fresh	54, 905	2, 470	43, 750	2, 836	60, 940	1, 911	6, 910	179	34, 995	703	31, 255	401	12, 850	200
Swordfish, fresh													1, 608	259
Other, fresh	8, 390	56	9, 825	135	14. 545	145	44, 400	800	19, 620	199	97, 550	1, 087	141, 890	1, 365
Total, fresh	604, 936	25, 617	221, 334	10, 367	1, 197, 305	33, 976	4, 361, 232	94, 555	3, 871, 806	74, 736	2, 531, 655	46, 489	2, 810, 143	40, 987
Total, salted					3, 420	154	4. 500	152	107, 520	2, 931	50, 030	1, 182	419, 155	13, 284
Grand total	604, 936	25, 617	221, 334	10, 367	1, 200. 725	34, 130	4, 365, 732	94, 707	3, 979, 326	77, 667	2, 581, 685	47, 671	3, 229, 298	54, 271

Species	August		September		October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:												
Large	176, 105	$5, 823	135, 173	$5, 006	403, 385	$20, 443	78, 811	$4, 207	76, 030	$2, 653	7, 924, 179	$210, 142
Market	340, 085	7, 064	17, 080	560	617, 790	12, 793	8, 715	212	59, 390	1, 059	3, 266, 308	57, 101
Scrod	----	----	----	----	6, 265	92	265	4	1, 340	24	29, 215	463
Cod, salted:												
Large	312, 683	9, 380	167, 619	5, 029	402, 531	12, 004	98, 793	3, 458	----	----	1, 204, 215	37, 379
Market	271, 698	5, 436	115, 814	2, 317	117, 643	2, 948	53, 602	1, 340	----	----	701, 021	15, 450
Scrod	78, 976	1, 185	19, 881	199	28, 719	431	38, 660	580	----	----	195, 368	2, 832
Haddock, fresh:												
Large	133, 045	4, 329	84, 210	3, 264	260, 620	6, 426	10, 795	567	70, 240	2, 234	2, 470, 588	63, 668
Scrod	349, 000	7, 637	157, 450	3, 667	537, 525	7, 833	15, 580	267	48, 745	731	2, 420, 692	38, 387
Haddock, salted, large	2, 000	70	----	----	4, 000	60	----	----	----	----	6, 000	130
Hake, fresh:												
Large	5, 770	100	13, 975	374	279, 760	9, 456	109, 930	3, 450	43, 335	982	552, 175	16, 624
Small	290	5	660	12	----	----	----	----	----	----	1, 200	22
Hake, salted, large	500	8	7, 360	110	1, 530	38	----	----	----	----	9, 390	156
Pollock, fresh	39, 005	755	352, 780	6, 745	1, 418, 960	32, 569	6, 299, 160	77, 983	2, 635, 400	33, 211	11, 140, 955	160, 721
Pollock, salted	280	5	510	8	----	----	----	----	----	----	790	13
Cusk, fresh	31, 885	476	2, 585	44	1, 140	20	4, 655	95	10, 845	203	187, 320	2, 373
Cusk, salted	500	9	----	----	400	10	----	----	----	----	1, 600	33
Halibut, fresh	----	----	----	----	12	2	----	----	239	33	651	95
Halibut, salted	----	----	----	----	----	----	----	----	----	----	4, 120	215
Mackerel, fresh	2, 503, 865	28, 571	3, 042, 710	36, 014	375, 390	5, 737	54, 980	3, 871	11, 625	1, 063	7, 848, 295	103, 051
Mackerel, salted	99, 380	2, 800	125, 900	3, 463	6, 680	144	29, 200	1, 022	----	----	446, 980	13, 549
Flounders, fresh	3, 490	78	9, 390	548	51, 820	1, 076	27, 935	1, 025	28, 755	1, 176	366, 995	12, 603
Swordfish, fresh	3, 075	663	4, 466	670	130	28	----	----	----	----	9, 279	1, 620
Herring, salted	----	----	----	----	----	----	----	----	262, 200	7, 935	262, 200	7, 935
Other, fresh	35, 438	437	146, 320	1, 173	499, 255	5, 044	19, 383	217	44, 037	479	1, 080, 653	11, 137
Total, fresh	3, 621, 053	55, 938	3, 966, 799	58, 077	4, 452, 052	101, 519	6, 630, 209	91, 898	3, 029, 981	43, 848	37, 298, 505	678, 007
Total, salted	766, 017	18, 893	437, 084	11, 126	561, 503	15, 635	220, 255	6, 400	262, 200	7, 935	2, 831, 684	77, 692
Grand total	4, 387, 070	74, 831	4, 403, 883	69, 203	5, 013, 555	117, 154	6, 850, 464	98, 298	3, 292, 181	51, 783	40, 130, 189	755, 699

Landings by fishing vessels at the three principal New England ports, 1934—Continued

PORTLAND: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	72, 843	$2, 933	65, 522	$3, 171	181, 158	$5, 013	705, 662	$13, 793	354, 085	$6, 561	525, 515	$13, 060	427, 837	$10, 315
Market	42, 179	1, 177	39, 090	1, 421	184, 136	3, 940	885, 465	17, 059	217, 426	3, 503	38, 147	624	14, 017	183
Scrod	1, 730	17	1, 005	8	360	3	1, 150	6	130		270	2	685	3
Haddock, fresh:														
Large	163, 772	9, 663	100, 780	6, 354	165, 832	6, 927	1, 217, 275	23, 935	825, 593	16, 191	79, 318	3, 423	182, 455	5, 863
Scrod	2, 796	40	700	14	6, 342	112	637, 005	12, 118	232, 128	4, 097	1, 280	9	3, 359	27
Hake, fresh:														
Large	63, 902	2, 389	20, 357	1, 102	52, 969	2, 198	69, 172	1, 496	104, 883	1, 734	138, 948	2, 501	163, 584	1, 683
Small	1, 770	19	1, 315	12	4, 895	42	2, 595	16	360	2	2, 302	31	820	4
Pollock, fresh	24, 660	402	11, 220	274	37, 472	500	60, 127	305	46, 437	285	54, 029	427	56, 469	434
Cusk, fresh	90, 963	2, 567	56, 709	2, 031	155, 713	3, 769	204. 332	2, 573	114, 432	1, 490	79, 900	1, 335	40, 292	588
Halibut, fresh	370	57	166	29	857	129	10, 442	934	39, 921	738	16, 557	2, 893	25, 343	3, 299
Mackerel, fresh											100, 156	2, 414	22, 552	340
Mackerel, salted											1, 425	28		
Flounders, fresh	29, 542	1, 134	22, 256	1, 143	81, 315	2, 292	62, 570	854	57, 977	1, 096	69, 024	1, 148	66, 665	1, 121
Swordfish, fresh													70, 953	13, 023
Herring, fresh											116, 400	723	161, 200	1, 414
Other, fresh	4, 347	160	3, 506	169	8, 496	293	27, 444	208	39, 013	1, 791	20, 250	1, 752	70, 749	1, 495
Total, fresh	498, 874	20, 558	322, 626	15, 728	879, 545	25, 218	3, 883, 239	73, 297	2, 032, 385	37, 488	1, 242, 096	30, 342	1, 306, 980	39, 792
Total, salted											1, 425	28		
Grand total	498, 874	20, 558	322, 626	15, 728	879, 545	25, 218	3, 883, 239	73, 297	2, 032, 385	37, 488	1, 243, 521	30, 370	1, 306, 980	39, 792

Species	August		September		October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:												
Large	501,079	$17,873	236,292	$9,514	132,637	$6,592	90,782	$3,967	39,065	$1,727	3,332,477	$94,519
Market	12,993	203	13,601	268	27,148	643	29,869	797	13,244	379	1,517,315	30,197
Scrod	195	1	690	6	400	4	1,052	11	775	6	8,442	67
Cod, salted:												
Large	14,910	522	-----	-----	-----	-----	-----	-----	-----	-----	14,910	522
Market	2,960	89	-----	-----	-----	-----	-----	-----	-----	-----	2,960	89
Haddock, fresh:												
Large	160,503	5,805	97,281	5,609	58,267	3,997	109,053	6,662	61,779	3,984	3,221,908	98,413
Scrod	2,320	20	2,247	22	1,026	19	1,775	22	780	6	891,758	16,506
Hake, fresh:												
Large	342,952	3,933	294,105	4,931	546,843	12,470	328,966	8,614	163,458	5,361	2,290,139	48,412
Small	5,250	39	2,470	14	1,890	16	2,235	21	1,525	14	27,427	230
Hake, salted, large	175	3	-----	-----	-----	-----	-----	-----	-----	-----	175	3
Pollock, fresh	113,586	1,293	196,333	2,190	158,763	1,856	159,817	1,456	36,780	512	955,693	9,934
Pollock, salted	110	2	-----	-----	-----	-----	-----	-----	-----	-----	110	2
Cusk, fresh	41,811	626	37,736	862	121,250	2,855	108,740	2,670	69,590	1,954	1,121,468	23,320
Cusk, salted	125	2	-----	-----	-----	-----	-----	-----	-----	-----	125	2
Halibut, fresh	27,259	1,968	8,095	1,051	340	50	1,023	147	146	30	130,519	11,325
Mackerel, fresh	321,569	2,961	673,984	4,973	100,910	1,871	9,105	619	-----	-----	1,228,276	13,178
Mackerel, salted	15,800	59	-----	-----	-----	-----	-----	-----	-----	-----	17,225	87
Flounders, fresh	50,281	1,181	16,908	522	7,650	351	6,300	197	37,706	1,457	508,194	12,496
Swordfish, fresh	41,354	6,160	27,812	4,792	-----	-----	-----	-----	-----	-----	140,119	23,975
Herring, fresh	117,800	734	-----	-----	-----	-----	-----	-----	-----	-----	395,400	2,871
Other, fresh	47,935	1,989	13,316	295	16,823	303	19,530	410	16,995	321	288,404	9,186
Total, fresh	1,786,887	44,786	1,620,870	35,049	1,173,947	31,027	868,247	25,593	441,843	15,751	16,057,539	394,629
Total, salted	34,080	677	-----	-----	-----	-----	-----	-----	-----	-----	35,505	705
Grand total	1,820,967	45,463	1,620,870	35,049	1,173,947	31,027	868,247	25,593	441,843	15,751	16,093,044	395,334

Landings by fishing vessels at the three principal New England ports, 1934—Continued

SUMMARY: BY PORTS

Species	Boston		Gloucester		Portland		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	28, 517, 675	$807, 730	7, 921, 179	$210, 142	3, 332, 477	$94, 519	39, 774, 331	$1, 112, 391
Market	40, 544, 632	961, 060	3, 266, 308	57, 101	1, 517, 315	30, 197	45, 328, 255	1, 048, 358
Scrod	229, 035	4, 423	29, 215	463	8, 442	67	266, 692	4, 953
Cod, salted:								
Large	60, 500	2, 336	1, 204, 215	37, 379	14, 910	522	1, 279, 625	40, 237
Market	22, 700	395	701, 021	15, 450	2, 960	89	726, 681	15, 934
Scrod			195, 368	2, 832			195, 368	2, 832
Haddock, fresh:								
Large	68, 276, 732	2, 245, 644	2, 470, 588	63, 668	3, 221, 908	98, 413	73, 969, 228	2, 407, 725
Scrod	50, 482, 003	1, 059, 242	2, 420, 692	38, 387	891, 758	16, 506	53, 794, 453	1, 114, 135
Haddock, salted, large			6, 000	130			6, 000	130
Hake, fresh:								
Large	3, 438, 887	95, 549	552, 175	16, 624	2, 290, 139	48, 412	6, 281, 201	160, 585
Small	769, 855	23, 944	1, 200	22	27, 427	230	798, 482	24, 196
Hake, salted, large	4, 370	55	9, 390	156	175	3	13, 935	214
Pollock, fresh	8, 698, 871	145, 637	11, 140, 955	160, 721	955, 693	9, 934	20, 795, 519	316, 292
Pollock, salted			790	13	110	2	900	15
Cusk, fresh	2, 613, 335	52, 507	187, 320	2, 373	1, 121, 468	23, 320	3, 922, 123	78, 200
Cusk, salted			1, 600	33	125	2	1, 725	35
Halibut, fresh	1, 646, 456	193, 726	651	95	130, 519	11, 325	1, 777, 626	205, 146
Halibut, salted			4, 120	215			4, 120	215
Mackerel, fresh	21, 002, 336	422, 548	7, 848, 295	103, 051	1, 228, 276	13, 178	30, 078, 907	538, 777
Mackerel, salted	3, 000	77	446, 980	13, 549	17, 225	87	467, 205	13, 713
Flounders, fresh	10, 769, 825	374, 270	366, 995	12, 603	508, 194	12, 496	11, 645, 014	399, 369
Swordfish, fresh	1, 314, 095	240, 254	9, 279	1, 620	140, 119	23, 975	1, 463, 493	265, 849
Herring, fresh					395, 400	2, 871	395, 400	2, 871
Herring, salted			262, 200	7, 935			262, 200	7, 935
Other, fresh	5, 298, 281	101, 967	1, 080, 653	11, 137	288, 404	9, 186	[1] 6, 667, 338	122, 290
Total, fresh	243, 602, 018	6, 728, 501	37, 298, 505	678, 007	16, 057, 539	394, 629	296, 958, 062	7, 801, 137
Total, salted	90, 570	2, 863	2, 831, 684	77, 692	35, 505	705	2, 957, 759	81, 260
Grand total	243, 692, 588	6, 731, 364	40, 130, 189	755, 699	16, 093, 044	395, 334	299, 915, 821	7, 882, 397

[1] The items under "Other, fresh" include alewives, 336,460 pounds, value $2,506; butterfish, 98,324 pounds, value $7,543; cunner (perch), 600 pounds, value $6; eels, 4,160 pounds, value $147; frigate mackerel, 10,965 pounds, value $548; herring smelt, 19,187 pounds, value $514; rosefish, 1,841,451 pounds, value $18,786; scup, 1,100 pounds, value $43; sea robins, 1,665 pounds, value $34; shad, 178,420 pounds, value $2,170; sharks, 25,252 pounds, value $441; skates, 6,930 pounds, value $97; squeteagues, gray, 20 pounds, value $2; sturgeon, 1,429 pounds, value $121; tuna or "horse mackerel", 11,762 pounds, value $385; whiting, 669,713 pounds, value $10,437; wolffish, 3,241,429 pounds, value $66,589; mixed fish, 18,915 pounds, value $141; lobsters, 82 pounds, value $25; scallops, 50,897 pounds, value $5,513; shrimp, 400 pounds, value $48; squid, 4,060 pounds, value $234; livers, 65,043 pounds, value $1,461; sounds, 600 pounds, value $24; spawn, 75,964 pounds, value $4,424; and tongues, 2,510 pounds, value $51.

BIOLOGICAL ASPECT

In 1934 the fishing fleet landing fares at Boston and Gloucester, Mass., and Portland, Maine, and operating on the fishing banks of the North Atlantic, numbered 393 steam, motor, and sail vessels of 5-net-ton capacity or greater as measured by the United States Customs Service. These vessels made 12,323 trips to the fishing grounds, and were absent from port 52,441 days, or an average of 4.2 days per trip. The catch of edible fish landed at the three ports amounted to 302,262,030 pounds when the salted fish had been converted to the basis of fresh gutted or round fish as usually landed. This, however, does not represent the entire catch of edible fish of these vessels, for small quantities, estimated at not more than 5 percent of their total catch, were landed at ports in New England other than these three, at New York City and at ports in New Jersey.

Otter trawls on all sizes of vessels accounted for 194,453,361 pounds, or 64 percent of the total landings. Line trawls were next in importance, accounting for 55,214,633 pounds, or 18 percent of the total landings.

The catch taken on Sable Island Bank and landed at the three ports amounted to 101,088,595 pounds, or 33 percent of the total; that on shore grounds, 72,469,490 pounds, or 24 percent; Georges Bank, 41,181,940 pounds, or 14 percent; Browns Bank, 28,461,481 pounds, or 9 percent; South Channel, 19,289,022 pounds, or 6 percent; and Quereau Bank, 15,232,367 pounds, or 5 percent. No other bank accounted for as much as 5,000,000 pounds in the landings at the three ports.

Landings by fishing vessels at the three principal New England ports, 1934

BY GEAR AND FISHING GROUNDS

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
Line trawls:	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Grand Bank	3	5	178	38, 648	9, 076					
Green Bank	2	3	87	47, 576	3, 220				16, 891	
St. Peters Bank	2	3	45	2, 500	4, 000		7, 500			
Off Newfoundland (Treaty Coast)	1	1	31	396, 300	66, 462	34, 157				
Bay of Fundy	3	4	16	5, 340	2, 817		260		16, 105	
Gulf of St. Lawrence	5	8	284	1, 360, 395	1, 183, 148	352, 632	15, 180		2, 835	
Quereau Bank	6	13	265	258, 755	112, 640	995	17, 800	9, 900	36, 590	
Sable Island Bank (Western Bank)	34	77	1, 027	2, 207, 798	1, 956, 256	5, 570	1, 782, 350	247, 095	91, 047	11, 400
Sable Island Bank (Western Bank) (occasional)							19, 225			
Cape Shore	31	78	1, 073	746, 725	1, 251, 843	400	1, 282, 645	305, 600	308, 249	
La Have Bank	28	52	608	690, 946	886, 577		845, 100	241, 350	87, 060	
Roseway Bank	5	5	52	75, 900	106, 600		55, 000	18, 300	9, 480	
Browns Bank	35	230	2, 620	3, 201, 138	3, 341, 586	5, 300	5, 607, 133	1, 198, 982	450, 295	6, 500
Georges Bank	30	76	733	1, 549, 070	572, 316		1, 260, 965	87, 800	58, 460	
South Channel	35	146	1, 163	1, 270, 095	886, 655		3, 412, 000	118, 735	295, 585	2, 750
South Channel (occasional)				7, 200	1, 800					
Off Highland Light	8	15	79	13, 810	9, 855		111, 810	1, 705	20, 740	2, 400
Off Chatham	6	13	84	30, 535	18, 470		124, 605	7, 850	27, 420	
Nantucket Shoals	2	2	18	4, 080	1, 800		11, 950		12, 500	
Grand Manan	1	1	8	3, 065	1, 105			985	755	
Bank Comfort	1	1	2	545	100		417		4, 850	
Cashes Bank	25	90	499	290, 297	185, 280	2, 930	381, 985	25, 845	535, 795	47, 545
Fippenies Bank	13	16	85	42, 050	19, 970	530	81, 235	3, 655	47, 780	7, 310
Platts Bank	12	37	77	42, 320	17, 115	1, 287	73, 383	1, 906	69, 360	1, 975
Jeffreys Ledge	19	98	213	72, 525	30, 922	1, 360	222, 585	3, 715	150, 255	3, 170
Middle Bank (Stellwagen)	14	71	346	60, 180	28, 045		376, 465	4, 780	170, 300	
Shore, general	87	1, 121	2, 752	939, 700	527, 901	16, 420	1, 279, 686	90, 051	1, 755, 699	222, 615
Shore, general (occasional)				3, 400	800		1, 000			600
Total	[1] 116	2, 166	12, 345	13, 360, 893	11, 226, 359	421, 851	16, 970, 279	2, 368, 254	4, 168, 051	306, 265
Hand lines:										
Cape Shore	3	4	66	35, 550	54, 795		6, 575	800	800	
Georges Bank	5	14	164	209, 125	101, 475		800			
Georges Bank (occasional)				3, 000	3, 000					
Nantucket Shoals	2	7	55	37, 100	30, 330		390			
Shore, general	2	5	17	16, 925	4, 710		460		1, 360	
Shore, general (occasional)					60		50	25	40	
Total	[1] 9	30	302	301, 700	194, 370		8, 275	825	2, 200	

Harpoons:										
Sable Island Bank (Western Bank)	3	3	68	-----	-----	-----	-----	-----	-----	-----
Cape Shore	35	36	932	-----	-----	-----	-----	-----	-----	-----
La Have Bank	1	1	22	-----	-----	-----	-----	-----	-----	-----
Browns Bank	42	58	1, 208	-----	-----	-----	-----	-----	-----	-----
Georges Bank	49	74	1, 530	-----	-----	-----	-----	-----	-----	-----
South Channel	1	1	4	-----	-----	-----	-----	-----	-----	-----
Nantucket Shoals	3	3	51	-----	-----	-----	-----	-----	-----	-----
South	3	3	57	-----	-----	-----	-----	-----	-----	-----
Shore, general	3	5	59	-----	-----	-----	-----	-----	-----	-----
Total	[1] 58	184	3, 931	-----	-----	-----	-----	-----	-----	-----
Otter trawls, large:										
St. Peters Bank	3	3	39	52, 000	138, 390	-----	174, 950	10, 400	-----	-----
Gulf of St. Lawrence	1	1	14	1, 000	8, 750	-----	31, 700	21, 000	93, 800	-----
Quereau Bank	46	115	1, 508	1, 128, 415	5, 337, 840	60, 890	1, 705, 415	5, 464, 440	33, 525	-----
Sable Island Bank (Western Bank)	54	602	7, 337	11, 957, 459	18, 034, 093	23, 770	21, 894, 178	30, 103, 083	453, 323	18, 750
Cape Shore	2	3	28	4, 200	8, 200	-----	84, 050	13, 500	7, 425	-----
Emerald Bank	7	10	113	172, 920	306, 110	-----	375, 800	162, 670	7, 050	-----
La Have Bank	6	8	103	153, 980	190, 250	-----	185, 165	129, 295	21, 265	-----
Browns Bank	40	89	963	1, 258, 106	1, 365, 896	250	3, 638, 469	2, 357, 695	47, 085	-----
Georges Bank	49	255	2, 732	2, 373, 535	4, 146, 720	95, 785	9, 724, 060	6, 484, 145	157, 290	-----
South Channel	28	54	577	362, 470	509, 615	3, 400	3, 117, 120	985, 460	48, 945	-----
Middle Bank (Stellwagen)	3	3	26	19, 000	16, 800	-----	169, 300	115, 000	1, 500	-----
Shore, general	12	14	143	375, 150	537, 200	-----	473, 450	406, 550	4, 400	7, 200
Total	[1] 57	1, 157	13, 583	17, 858, 235	30, 599, 864	184, 095	41, 573, 657	46, 253, 238	875, 608	25, 950
Otter trawls, medium:										
Quereau Bank	3	4	41	18, 250	120, 400	-----	22, 600	23, 700	1, 950	-----
Sable Island Bank (Western Bank)	13	57	627	876, 530	931, 940	-----	1, 996, 725	1, 112, 350	36, 210	850
Sable Island Bank (Western Bank) (occasional)	-----	-----	-----	-----	9, 000	-----	-----	10, 800	-----	-----
Cape Shore	6	7	68	4, 215	15, 690	-----	75, 050	90, 075	3, 665	-----
Emerald Bank	2	3	32	31, 645	37, 925	190	55, 300	13, 100	4, 380	-----
La Have Bank	4	4	39	35, 910	43, 960	3, 925	22, 500	26, 400	1, 350	-----
Browns Bank	21	45	453	314, 645	440, 325	-----	1, 404, 125	575, 825	7, 470	-----
Georges Bank	37	264	2, 533	1, 582, 530	1, 293, 880	11, 100	5, 261, 220	1, 945, 500	41, 330	1, 850
South Channel	27	148	1, 312	419, 210	617, 305	11, 450	3, 492, 120	1, 024, 150	45, 803	-----
South Channel (occasional)	-----	-----	-----	3, 100	3, 500	-----	25, 600	5, 000	600	-----
Off Highland Light	9	13	83	6, 240	5, 190	-----	79, 850	14, 520	4, 105	-----
Off Chatham	13	40	305	61, 205	314, 512	1, 900	479, 095	66, 050	10, 190	800
Nantucket Shoals	5	7	64	16, 700	56, 450	-----	100, 400	32, 600	2, 200	-----
Cashes Bank	2	2	14	620	655	-----	7, 960	7, 085	1, 035	-----
Middle Bank (Stellwagen)	4	4	18	3, 975	2, 770	950	12, 875	3, 220	4, 625	-----
Shore, general	72	649	2, 206	318, 345	251, 585	8, 780	706, 695	153, 703	80, 520	148, 590
Total	[1] 87	1, 247	7, 795	3, 693, 120	4, 145, 087	38, 295	13, 742, 115	5, 104, 078	245, 433	152, 090
Otter trawls, small:										
Sable Island Bank (Western Bank)	1	2	14	110	20	-----	15	-----	-----	600
Georges Bank	2	2	13	1, 225	2, 725	-----	16, 825	5, 300	-----	-----
South Channel	3	4	23	650	25, 375	800	33, 400	21, 600	500	600
Off Highland Light	1	1	11	660	700	-----	1, 850	-----	50	-----

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[1] Exclusive of duplication.

Landings by fishing vessels at the three principal New England ports, 1934—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Otter trawls, small—Continued.										
Nantucket Shoals	1	1	11	100	700		5,900			
Shore, general	96	1,603	4,659	640,213	391,288	8,695	1,287,498	41,155	444,502	312,937
Shore, general (occasional)										
Total	[1] 100	1,613	4,731	642,958	420,808	9,495	1,345,488	68,055	445,052	314,137
Sink gill nets:										
Jeffreys Ledge	1	2	2	845	420		150		1,849	
Shore, general	25	4,180	4,182	6,347,478	151,106	55	341,624	3	569,484	40
Total	[1] 25	4,182	4,184	6,348,323	151,526	55	341,774	3	571,333	40
Drift gill nets:										
Bay of Islands	1	1	28							
Off Newfoundland (Treaty Coast)	1	1	28							
Gulf of St. Lawrence (occasional)										
Shore, general	18	84	181							
Shore, general (occasional)										
Total	[1] 19	86	237							
Purse seines:										
Sable Island Bank (Western Bank)	1	1	12							
Georges Bank	1	1	3							
South Channel	38	64	202	390						
Off Highland Light	2	2	7							
Off Chatham	17	22	68							
Nantucket Shoals	3	3	13							
Middle Bank (Stellwagen)	5	7	23							
South	22	30	122							
Shore, general	94	1,521	4,811							
Total	[1] 95	1,651	5,261	[2] 390						
Scallop drags:										
Georges Bank	1	7	72							
Georges Bank (occasional)										
Total	1	7	72							
Grand total	[1] 393	12,323	52,441	42,205,619	46,738,014	653,521	73,981,588	53,794,453	6,307,677	798,482

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Other	Total
Line trawls:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Grand Bank		945	89, 264					137, 933
Green Bank		760	127, 075		715			196, 237
St. Peters Bank			98, 307					112, 307
Off Newfoundland (Treaty Coast)								496, 919
Bay of Fundy	680	56, 087						81, 289
Gulf of St. Lawrence	165		16, 256	4, 685				2, 935, 296
Quereau Bank	1, 180	43, 600	281, 903		180			763, 543
Sable Island Bank (Western Bank)	67, 474	88, 977	157, 348	4, 250	127		2, 710	6, 622, 402
Sable Island Bank (Western Bank) (occasional)								19, 225
Cape Shore	56, 075	273, 440	10, 670	3, 625			53, 995	4, 293, 267
La Have Bank	37, 580	131, 865	134, 561	2, 950	1, 925		6, 705	3, 066, 619
Roseway Bank	2, 540	27, 480	1, 375				7, 380	304, 055
Browns Bank	227, 469	835, 525	198, 781	13. 300	2, 701		107, 986	15, 196, 696
Georges Bank	66, 507	147, 745	76, 117	8, 575	550		4, 835	3, 832, 940
South Channel	219, 975	30, 045	22, 887	2, 970	425	1, 375	35, 065	6, 348, 562
South Channel (occasional)	185							9, 185
Off Highland Light	3, 770	9, 550	776				845	175, 261
Off Chatham	8, 700	2, 190	1, 068	2, 695			24, 750	248, 283
Nantucket Shoals	905	2, 700					200	34, 135
Grand Manan	3, 335	5, 015	79					14, 339
Bank Comfort	100	6, 625						12, 637
Cashes Bank	64, 150	612, 350	5, 481	25			5, 232	2, 156, 915
Fippenies Bank	8, 470	46, 650	1, 278				902	259, 830
Platts Bank	5, 064	83, 610	522				2, 021	298, 563
Jeffreys Ledge	7, 700	122, 080	1, 022	83			6, 058	621, 475
Middle Bank (Stellwagen)	11, 805	247, 975	898				3, 863	904, 311
Shore, general	142, 647	962, 206	7, 381	39, 905		35	81, 463	6, 065, 709
Shore, general (occasional)	700	100		100				6, 700
Total	937, 176	3, 787, 520	1, 233, 049	83, 163	[2] 6, 623	[2] 1, 410	344, 010	55, 214, 633
Hand lines:								
Gulf of St. Lawrence (occasional)						39, 420		39, 420
Cape Shore	3, 900	3, 800					2, 500	108, 720
Georges Bank	18, 045	3, 700	1, 059				2, 365	336, 569
Georges Bank (occasional)	3, 250		132				100	9, 482
Nantucket Shoals	3, 310	300	254				2, 280	73, 964
Shore, general	3, 300	19, 970	108				170	47, 003
Shore, general (occasional)								175
Total	31, 805	27, 770	1, 553			39, 420	7, 415	615, 333

[1] Exclusive of duplication.

[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1934—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Harpoons:								
Green Bank (occasional)					600			600
Sable Island Bank (Western Bank)					25, 430		180	25, 610
Cape Shore					231, 858		456	232, 314
Cape Shore (occasional)					413			413
La Have Bank					6, 904			6, 904
La Have Bank (occasional)					275			275
Browns Bank					612, 669		181	612, 850
Browns Bank (occasional)					4, 852			4, 852
Georges Bank					484, 553		600	485. 153
Georges Bank (occasional)					4, 517			4, 517
South Channel					160			160
Nantucket Shoals					19, 407			19, 407
South					35, 075			35, 075
Shore, general					23, 739		888	24, 627
Shore, general (occasional)					881			881
Total					1, 451, 333		2, 305	1, 453, 638

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Otter trawls, large:									
St. Peters Bank			364						376, 104
Gulf of St. Lawrence				19, 275				600	176, 125
Quereau Bank	121, 010	5, 125	28, 754	358, 980				7, 480	14, 251, 874
Sable Island Bank (Western Bank)	2, 127, 961	13, 945	336, 326	2, 275, 849	202			1, 889, 761	89, 128, 700
Cape Shore	625	3, 125		10, 895				600	132, 620
Emerald Bank	66, 600		3, 830	20, 100				10, 485	1, 125, 565
La Have Bank	65, 850	2, 340	4, 476	28, 400				6, 610	787, 631
Browns Bank	442, 185	4, 220	35, 475	158, 566				325, 335	9, 633, 282
Georges Bank	526, 665	25, 210	54, 152	674, 315		5, 285		251, 352	24, 518, 514
South Channel	110, 520	1, 920	13, 741	171, 990		400		81, 820	5, 407, 401
Middle Bank (Stellwagen)	2, 500		172	3, 986				800	329, 058
Shore, general	117, 100	300	5, 310	88, 125				31, 070	2, 045, 855
Total	3, 581, 016	56, 185	482, 600	3, 810, 481	202	5, 685		2, 605, 913	147, 912, 729
Otter trawls, medium:									
Quereau Bank	3, 850			4, 100				22, 100	216, 509
Sable Island Bank (Western Bank)	80, 440	1, 750	12, 600	111, 535				90, 595	5, 251, 525
Sable Island Bank (Western Bank) (occasional)			383	1, 800				1, 800	23, 783
Cape Shore	2, 760		260	5, 860				18, 015	215, 590

Emerald Bank	12, 400	120	291	17, 090	-----	-----	-----	1, 550	173, 991
La Have Bank	4, 175	100	426	1, 850	-----	-----	-----	770	141, 366
Browns Bank	121, 500	21, 585	7, 347	63, 630	-----	-----	-----	57, 349	3, 013, 801
Georges Bank	260, 150	2, 660	22, 926	1, 153, 730	5, 005	1, 070	-----	323, 946	11, 906, 897
South Channel	79, 175	550	10, 087	473, 735	-----	400	-----	113, 952	6, 287, 937
South Channel (occasional)	200	-----	162	1, 350	-----	-----	-----	900	40, 412
Off Highland Light	158, 520	-----	-----	25, 360	-----	75	-----	254, 315	548, 175
Off Chatham	57, 520	-----	195	86, 295	-----	-----	-----	317, 972	1, 395, 734
Nantucket Shoals	1, 500	-----	25	21, 370	-----	-----	-----	3, 375	234, 620
Cashes Bank	29, 500	-----	-----	705	-----	-----	-----	360	47, 920
Middle Bank (Stellwagen)	4, 500	11, 045	-----	19, 380	-----	-----	-----	5, 345	68, 685
Shore, general	3, 967, 525	2, 965	3, 142	1, 783, 119	-----	1, 945	-----	919, 125	8, 346, 039
Total	4, 783, 715	40, 775	57, 844	3, 770, 909	[2] 5, 005	[2] 3, 490	-----	2, 131, 469	37, 913, 425
Otter trawls, small:									
Sable Island Bank (Western Bank)	-----	40	-----	3, 840	-----	-----	-----	325	4, 950
Georges Bank	200	-----	-----	4, 235	-----	-----	-----	-----	30, 510
South Channel	-----	-----	-----	3, 900	-----	-----	-----	-----	86, 825
Off Highland Light	400	-----	34	670	-----	-----	-----	420	4, 784
Nantucket Shoals	80	-----	-----	-----	-----	-----	-----	-----	6, 780
Shore, general	447, 672	6, 051	10, 760	3, 952, 001	-----	210	-----	946, 376	8, 489, 358
Shore, general (occasional)	-----	-----	-----	4, 000	-----	-----	-----	-----	4, 000
Total	448, 352	6, 091	10, 794	3, 968, 646	-----	[2] 210	-----	947, 121	8, 627, 207
Sink gill nets:									
Jeffreys Ledge	18, 365	-----	-----	-----	-----	-----	-----	435	22, 064
Shore, general	10, 985, 140	7, 060	26	4, 950	-----	9	-----	41, 556	18, 448, 531
Total	11, 003, 505	7, 060	26	4, 950	-----	[2] 9	-----	41, 991	18, 470, 595
Drift gill nets:									
Bay of Islands	-----	-----	-----	-----	-----	-----	196, 650	-----	196, 650
Off Newfoundland (Treaty Coast)	-----	-----	-----	-----	-----	-----	196, 650	-----	196, 650
Gulf of St. Lawrence (occasional)	-----	-----	-----	-----	-----	62, 910	-----	-----	62, 910
Shore, general	-----	-----	-----	-----	-----	145, 810	-----	1, 915	147, 725
Shore, general (occasional)	-----	-----	-----	-----	-----	670	-----	-----	670
Total	-----	-----	-----	-----	-----	209, 390	393, 300	1, 915	604, 605
Purse seines:									
Sable Island Bank (Western Bank)	-----	-----	-----	-----	-----	12, 400	-----	-----	12, 400
Georges Bank	-----	-----	-----	-----	-----	6, 625	-----	-----	6, 625
South Channel	-----	-----	-----	-----	-----	1, 108, 150	-----	-----	1, 108, 540
Off Highland Light	-----	-----	-----	-----	-----	35, 110	-----	-----	35, 110
Off Chatham	-----	-----	-----	-----	-----	334, 150	-----	-----	334, 150
Nantucket Shoals	-----	-----	-----	-----	-----	70, 950	-----	-----	70, 950

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[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1934—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Purse seines—Continued.									
Middle Bank (Stellwagen)						111, 880			111, 880
South						877, 260			877, 260
Shore, general	11, 660			6, 865	330	27, 893, 496	395, 400	534, 466	28, 842, 217
Total	[2] 11, 660			[2] 6, 865	[2] 330	30, 450, 021	395, 400	534, 466	31, 399, 132
Scallop drags:									
Georges Bank								47, 088	47, 088
Georges Bank (occasional)								3, 645	3, 645
Total								50, 733	50, 733
Grand total	20, 797, 229	3, 925, 401	1, 785, 866	11, 645, 014	1, 463, 493	30, 709, 635	788, 700	6, 667, 338	302, 262, 03

NOTE.—The 3 principal New England ports are Boston, and Gloucester, Mass., and Portland, Maine. Otter trawls (including V-D trawls) are classified according to the size of the vessel. The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation. "Occasional" after the name of a bank or ground indicates that the vessel or vessels contributing to the catch as shown fished chiefly with another type of gear. In such cases the number of vessels fishing, number of trips, and number of days absent, are shown under the principal type of gear used.

SUMMARY: BY FISHING GROUNDS

Fishing grounds	Vessel fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Off Newfoundland:										
Area XIX:										
Bay of Islands	1	1	28							
Off Newfoundland (Treaty Coast)	2	2	59	396, 300	66, 462	34, 157				
Area XX:										
Grand Bank	3	5	178	38, 648	9, 076					
Green Bank	2	3	87	47, 576	3, 220				16, 891	
St. Peters Bank	5	6	84	54, 500	142, 390		182, 450	10, 400		
Total	[1] 12	17	436	537, 024	221, 148	34, 157	182, 450	10, 400	16, 891	

Off Canada:										
Area XIX:										
Gulf of St. Lawrence	6	9	298	1,361,395	1,191,898	352,632	46,880	21,000	96,635	----------
Area XXI:										
Quereau Bank	55	132	1,814	1,405,420	5,570,880	61,885	1,745,815	5,498,040	72,065	----------
Sable Island Bank (Western Bank)	103	742	9,085	15,041,897	20,931,309	29,340	25,692,493	31,473,328	580,580	31,600
Cape Shore	70	128	2,167	790,690	1,330,528	400	1,448,320	409,975	320,139	----------
Emerald Bank	9	13	145	204,565	344,035	190	431,100	175,770	11,430	----------
La Have Bank	39	65	772	880,836	1,120,787	3,925	1,052,765	397,045	109,675	----------
Roseway Bank	5	5	52	75,900	106,600	----------	55,000	18,300	9,480	----------
Browns Bank	130	422	5,244	4,773,889	5,147,807	5,550	10,649,727	4,132,502	504,850	6,500
Area XXII:										
Bay of Fundy	3	4	16	5,340	2,817	----------	260	----------	16,105	----------
Total	[1] 166	1,520	19,593	24,539,932	35,746,661	453,922	41,122,360	42,125,960	1,720,959	38,100
Off United States:										
Area XXII:										
Georges Bank	157	693	7,780	5,718,485	6,120,116	106,885	16,263,870	8,522,745	257,080	1,850
South Channel	128	417	3,281	2,063,115	2,044,250	15,650	10,080,240	2,154,945	391,433	3,350
Off Highland Light	20	31	180	20,710	15,745	----------	193,510	16,225	24,895	2,400
Off Chatham	36	75	457	91,740	332,982	1,900	603,700	73,900	37,610	800
Nantucket Shoals	15	23	212	57,980	89,280	----------	118,640	32,600	14,700	----------
Grand Manan	1	1	8	3,065	1,105	----------	----------	985	755	----------
Bank Comfort	1	1	2	545	100	----------	417	----------	4,850	----------
Cashes Bank	27	92	513	290,917	185,935	2,930	389,945	32,930	536,830	47,545
Fippenies Bank	13	16	85	42,050	19,970	530	81,235	3,655	47,780	7,310
Platts Bank	12	37	77	42,320	17,115	1,287	73,383	1,906	69,360	1,975
Jeffreys Ledge	20	100	215	73,370	31,342	1,360	222,735	3,715	152,104	3,170
Middle Bank (Stellwagen)	25	85	413	83,155	47,615	950	558,640	123,000	176,425	----------
Shore, general	293	9,182	19,010	8,641,211	1,864,650	33,950	4,090,463	691,487	2,856,005	691,982
Area XXIII:										
South	25	33	179	----------	----------	----------	----------	----------	----------	----------
Total	[1] 378	10,786	32,412	17,128,663	10,770,205	165,442	32,676,778	11,658,093	4,569,827	760,382
Grand total	[1] 393	12,323	52,441	42,205,619	46,738,014	653,521	73,981,588	53,794,453	6,307,677	798,482

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[1] Exclusive of duplication.

[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1934—Continued

SUMMARY: BY FISHING GROUNDS—Continued

Fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
Off Newfoundland:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Area XIX:									
Bay of Islands							196, 650		196, 650
Off Newfoundland (Treaty Coast)							196, 650		693, 569
Area XX:									
Grand Bank		945	89, 264						137, 933
Green Bank		760	127, 075		1, 315				196, 837
St. Peters Bank			98, 671						488, 411
Total		1, 705	315, 010		1, 315		393, 300		1, 713, 400
Off Canada:									
Area XIX:									
Gulf of St. Lawrence	165		16, 256	23, 960		102, 330		600	3, 213, 751
Area XXI:									
Quereau Bank	126, 040	48, 725	310, 657	363, 080	180			29, 580	15, 232, 367
Sable Island Bank (Western Bank)	2, 275, 875	104, 712	506, 657	2, 397, 274	25, 759	12, 400		1, 985, 371	101, 088, 595
Cape Shore	63, 360	280, 365	10, 930	20, 380	232, 271			75, 566	4, 982, 924
Emerald Bank	79, 000	120	4, 121	37, 190				12, 035	1, 299, 556
La Have Bank	107, 605	134, 305	139, 463	33, 200	9, 104			14, 085	4, 002, 795
Roseway Bank	2, 540	27, 480	1, 375					7, 380	304, 055
Browns Bank	791, 154	861, 330	241, 603	235, 496	620, 222			490, 851	28, 461, 481
Area XXII.									
Bay of Fundy	680	56, 087							81, 289
Total	3, 446, 419	1, 513, 124	1, 231, 062	3, 110, 580	887, 536	114, 730		2, 615, 468	158, 666, 813
Off United States:									
Area XXII:									
Georges Bank	874, 817	179, 315	154, 386	1, 840, 855	494, 625	12, 980		633, 931	41, 181, 940
South Channel	410, 055	82, 515	46, 877	653, 945	585	1, 110, 325		231, 737	19, 289, 022
Off Highland Light	162, 690	9, 550	810	26, 030		35, 185		255, 580	763, 330
Off Chatham	66, 220	2, 190	1, 263	88, 990		334, 150		342, 722	1, 978, 167
Nantucket Shoals	5, 795	3, 000	279	21, 370	19, 407	70, 950		5, 855	439, 856
Grand Manan	3, 335	5, 015	79						14, 339
Bank Comfort	100	6, 625							12, 637
Cashes Bank	93, 650	612, 350	5, 481	730				5, 592	2, 204, 835
Fippenies Bank	8, 470	46, 650	1, 278					902	259, 830
Platts Bank	5, 064	83, 610	522					2, 021	298, 563
Jeffreys Ledge	26, 055	122, 080	1, 022	83				6, 493	643, 539
Middle Bank (Stellwagen)	18, 805	259, 020	1, 070	23, 366		111, 880		10, 008	1, 413, 934
Shore, general	15, 675, 744	998, 652	26, 727	5, 879, 065	24, 950	28, 042, 175	395, 400	2, 557, 029	72, 469, 490

Area XXIII: South					35,075	877,260			912,335
Total	17,350,810	2,410,572	239,794	8,534,434	574,642	30,594,905	395,400	4,051,870	141,881,817
Grand total	20,797,229	3,925,401	1,785,866	11,645,014	1,463,493	30,709,635	788,700	6,667,338	302,262,030

NOTE.—The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. The roman numerals appearing in the stub of the above table refer to the numbers given these regions by the North American Council on Fishery Investigations.

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Maine, 1934

Fishing grounds	January	February	March	April	May	June	July	August	September	October	November	December	Total
Off Newfoundland:													
Area XIX:													
Bay of Islands												28	28
Off Newfoundland (Treaty Coast)										31		28	59
Area XX:													
Grand Bank			36		86		56						178
Green Bank						30			30	27			87
St. Peters Bank		21	22			2				24		15	84
Total		21	58		86	32	56		30	82		71	436
Off Canada:													
Area XIX: Gulf of St. Lawrence						18	73	116	34	33	24		298
Area XXI:													
Quereau Bank			34	17	40	71	36	101	132	308	249	816	1,804
Sable Island Bank (Western Bank)	474	860	1,084	1,544	1,076	688	948	705	547	83	562	509	9,080
Cape Shore	98	79	47	11	97	130	58	385	608	30	336	288	2,167
Emerald Bank		4		13							20	112	149
La Have Bank	250	34	28	34			82	64	72	57	53	97	771
Roseway Bank	9				9				9		15	10	52
Browns Bank	582	562	442	419	490	231	785	663	446	200	97	318	5,235
Area XXII: Bay of Fundy			7	9									16
Total	1,413	1,539	1,642	2,047	1,712	1,138	1,982	2,034	1,848	711	1,356	2,150	19,572

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Maine, 1934—Continued

Fishing grounds	January	February	March	April	May	June	July	August	September	October	November	December	Total
Off United States:													
Area XXII:													
Georges Bank	341	696	602	190	610	740	1,346	781	838	817	466	361	7,788
South Channel	133	95	346	96	254	626	438	521	442	218	84	36	3,289
Off Highland Light	48	10	27	13	----	3	----	7	8	32	24	8	180
Off Chatham	33	18	----	24	18	40	127	60	71	34	16	16	457
Nantucket Shoals	19	7	----	----	13	27	43	38	30	35	----	----	212
Grand Manan	----	----	----	----	8	----	----	----	----	----	----	----	8
Bank Comfort	----	----	----	----	----	----	2	----	----	----	----	----	2
Cashes Bank	33	9	43	35	29	12	44	39	24	107	111	27	513
Fippenies Bank	26	8	8	5	----	----	----	----	8	14	12	4	85
Platts Bank	12	28	13	----	----	----	----	----	----	2	8	14	77
Jeffreys Ledge	72	26	20	----	----	----	----	----	4	----	44	49	215
Middle Bank (Stellwagen Bank)	132	51	88	28	5	2	7	14	----	31	21	34	413
Shore, general	967	478	1,362	1,571	1,846	1,825	1,756	2,256	2,204	1,696	1,869	1,185	19,015
Area XXIII: South	----	----	----	6	113	60	----	----	----	----	----	----	179
Total	1,816	1,426	2,509	1,968	2,896	3,335	3,763	3,716	3,629	2,986	2,655	1,734	32,433
Grand total	3,229	2,986	4,209	4,015	4,694	4,505	5,801	5,750	5,507	3,779	4,011	3,955	52,441

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

MACKEREL FISHERY OF THE ATLANTIC COAST [6]

In 1934 the mackerel fleet landed 40,385,700 pounds of mackerel, an increase of 37 percent as compared with corresponding statistics for the previous year. In 1934, as in the previous year, fleet activity was curtailed for a portion of the season to avoid glutting the market. The curtailment, applying only to purse-seine vessels, was by mutual agreement during the period from May 27 to June 9 and thereafter by authority of the Code of Fair Competition for the Mackerel Fishing Industry under the National Recovery Administration, and consisted of the restrictions indicated in the footnotes of the following table. Unlike 1933, "dumping" of mackerel for lack of market was negligible in 1934.

Of the total landings, 20,253,000 pounds consisted of tinker sizes (under 1 pound each) and 20,132,700 pounds were of larger sizes. Practically all of the tinker mackerel were taken in the Gulf of Maine after July 15. There were no bull's-eye mackerel landed by the fleet.

Mackerel fishery of the Atlantic coast, 1934

CATCH: BY AREAS IN 7-DAY PERIODS

Date	Southern (area XXIII)		Block Island (area XXII, west of Nantucket Shoals)		Gulf of Maine (area XXII, north of Nantucket Shoals)		Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Apr. 8–14	2, 200	----------	----------	----------	----------	----------	2, 200
Apr. 15–21	1, 027, 500	9, 500	----------	----------	----------	----------	1, 037, 000
Apr. 22–28	357, 600	48, 200	----------	----------	----------	----------	405, 800
Apr. 29–May 5	697, 100	174, 500	----------	----------	----------	----------	871, 600
May 6–12	1, 966, 300	67, 400	----------	----------	----------	----------	2, 033, 700
May 13–19	553, 600	174, 100	627, 800	----------	----------	----------	1, 355, 500
May 20–26	----------	4, 000	1, 471, 100	127, 000	----------	800	1, 602, 900
May 27–June 2 [1]	----------	----------	1, 634, 700	22, 000	----------	28, 200	1, 684, 900
June 3–9 [2]	----------	----------	708, 200	36, 000	----------	1, 200	745, 400
June 10–16 [3]	----------	----------	366, 100	8, 000	83, 200	9, 400	466, 700
June 17–23 [3]	----------	----------	534, 300	4, 000	192, 800	21, 900	753, 000
June 24–30 [4]	----------	----------	803, 100	4, 000	489, 600	34, 800	1, 331, 500
July 1–7 [4]	----------	----------	47, 800	----------	1, 044, 200	11, 800	1, 103, 800
July 8–14 [4]	----------	----------	----------	----------	1, 275, 000	7, 500	1, 282, 500
July 15–21 [4]	----------	----------	7, 300	----------	1, 153, 200	11, 200	1, 171, 700
July 22–28 [4]	----------	----------	----------	----------	1, 469, 900	800	1, 470, 700
July 29–Aug 4 [4]	----------	----------	----------	----------	1, 174, 600	----------	1, 174, 600
Aug. 5–11	----------	----------	----------	----------	1, 801, 500	1, 000	1, 802, 500
Aug. 12–18	----------	----------	----------	----------	2, 483, 800	800	2, 484, 600
Aug. 19–25	----------	----------	----------	----------	2, 253, 500	----------	2, 253, 500
Aug. 26–Sept. 1	----------	----------	----------	----------	3, 695, 100	----------	3, 695, 100
Sept. 2–8	----------	----------	----------	----------	2, 395, 800	----------	2, 395, 800
Sept. 9–15	----------	----------	----------	----------	2, 431, 400	----------	2, 431, 400
Sept. 16–22	----------	----------	----------	----------	2, 420, 300	----------	2, 420, 300
Sept. 23–29	----------	----------	----------	----------	1, 986, 100	----------	1, 986, 100
Sept. 30–Oct. 6	----------	----------	----------	----------	951, 400	----------	951, 400
Oct. 7–13	----------	----------	----------	----------	967, 200	----------	967, 200
Oct. 14–20	----------	----------	----------	----------	323, 600	1, 000	324, 600

[1] Each vessel limited to 28,000 pounds per trip.

[2] Each vessel limited to 28,000 pounds per trip and fleet called into port June 5 to avoid further glutting of the market.

[3] One-half of fleet operated, each vessel of 20 tons gross or over subject to a limit of 5,000 pounds plus 1,000 pounds per member of crew plus 50 pounds pergross ton (average 20,300 pounds per vessel) per trip and each boat under 20 gross tons subject to a limit of 5,000 pounds plus 1,000 pounds per member of crew (average 13,000 pounds per boat) per trip.

[4] Entire fleet operated subject to same trip limit with 1 trip limit allowed per week and unfilled trip limits applied to following weeks' quotas.

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[6] This section, prepared by O. E. Sette of the Division of Scientific Inquiry, includes the landings at Cape May and Wildwood, N. J.; New York, N. Y.; Newport, R. I.; New Bedford, Woods Hole, Provincetown, Boston, and Gloucester, Mass.; and Portland and Boothbay Harbor, Maine, by purse-seine vessels, "seiners", and drift-gill-net vessels, "netters"; and such boats as fish by the same methods and on the same grounds as the vessels. It does not include the catch of the smaller boats or the catch by other forms of gear.

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

Mackerel fishery of the Atlantic coast, 1934—Continued

CATCH: BY AREAS IN 7-DAY PERIODS—Continued

Date	Southern (area XXIII)		Block Island (area XXII, west of Nantucket Shoals)		Gulf of Maine (area XXII, north of Nantucket Shoals)		Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Oct. 21-27					42,800		42,800
Oct. 28-Nov. 3					8,000	100	8,100
Nov. 4-10					3,900	5,400	9,300
Nov. 11-17						22,600	22,600
Nov. 18-24					5,200	36,600	41,800
Nov. 25-Dec. 1						41,500	41,500
Dec. 2-8						12,800	12,800
Dec. 9-15						300	300
Dec. 16-22						500	500
Total	4,604,300	477,700	6,200,400	201,000	28,652,100	250,200	40,385,700

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS

Designation	Vessels and boats	Tonnage	Crew	Trips	Total catch
SOUTHERN—AREA XXIII					
Seiners:	*Number*	*Net tons*	*Number*	*Number*	*Pounds*
Regular vessels	42	1,695	544	200	4,215,600
Miscellaneous vessels	9	339	100	21	388,700
Netters:					
Regular vessels	11	187	75	65	446,600
Miscellaneous vessels	2	21	11	4	24,500
Miscellaneous boats	1			2	6,600
Total	[5] 64	2,242	730	292	5,082,000
BLOCK ISLAND—AREA XXII					
(West of Nantucket Shoals only)					
Seiners:					
Regular vessels	55	2,138	688	287	6,010,200
Miscellaneous vessels	10	227	99	17	190,200
Netters:					
Regular vessels	12	201	81	26	188,000
Miscellaneous vessels	3	22	13	3	9,600
Miscellaneous boats	1			1	3,400
Total	[5] 80	2,588	881	334	6,401,400
GULF OF MAINE—AREA XXII					
(North of Nantucket Shoals only)					
Seiners:				1,525	26,675,100
Regular vessels	69	2,210	676	89	1,055,800
Miscellaneous vessels	21	356	169	149	921,200
Miscellaneous boats	18				
Netters:					
Spring and summer:					
Miscellaneous vessels	5	53	26	14	24,500
Miscellaneous boats	22			74	104,900
Fall:					
Regular vessels	12	322	93	82	95,900
Miscellaneous vessels	5	166	40	6	16,200
Miscellaneous boats	5			18	8,700
Total	[5] 100	3,107	1,004	1,957	28,902,300
Total seiners	[5] 92			2,288	39,456,800
Total netters	[5] 32			295	928,900
Grand total	[5] 112			2,583	40,385,700

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[5] Exclusive of duplication and of boats.

FISHERIES OF THE MIDDLE ATLANTIC STATES

(Area XXIII) [7]

The most recent complete fishery statistics for the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) are those collected for the year 1933. In that year the yield of the commercial fisheries amounted to 169,753,735 pounds, valued at $4,811,055 to the fishermen, representing an increase of 20 percent in volume and 3 percent in value as compared with the catch of the previous year. Detailed statistics of these fisheries for 1933 appear in "Fishery industries of the United States, 1934", Appendix II to the Report of the United States Commissioner of Fisheries, 1935. A summary of these fisheries as well as statistics of the shad fishery of the Hudson River for 1934 appear in the following tables.

Fisheries of the Middle Atlantic States, 1933

OPERATING UNITS: By States

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	825	1,267	----------	350	2,442
On boats and shore:					
Regular	1,509	954	----------	34	2,497
Casual	1,482	1,622	53	478	3,635
Total	3,816	3,843	53	862	8,574
Vessels:					
Steam	9	----------	----------	10	19
Net tonnage	1,773	----------	----------	1,237	3,010
Motor	160	208	----------	16	384
Net tonnage	2,422	3,470	----------	229	6,121
Sail	----------	3	----------	1	4
Net tonnage	----------	24	----------	8	32
Total vessels	169	211	----------	27	407
Total net tonnage	4,195	3,494	----------	1,474	9,163
Boats:					
Motor	636	1,029	5	77	1,747
Other	1,188	740	14	181	2,123
Accessory boats	39	88	----------	30	157
Apparatus:					
Purse seines:					
Menhaden	----------	8	----------	10	18
Length, yards	----------	2,806	----------	3,140	5,946
Other	2	7	----------	----------	9
Length, yards	800	2,510	----------	----------	3,310
Haul seines	71	105	12	61	249
Length, yards	5,926	9,040	1,635	18,990	35,591
Gill nets:					
Anchor	46	10	----------	----------	56
Square yards	40,832	5,830	----------	----------	46,662
Drift	254	605	7	63	929
Square yards	423,369	448,333	5,200	145,720	1,022,622
Runaround	43	69	----------	33	145
Square yards	124,822	210,695	----------	41,450	376,967
Stake	49	251	----------	99	399
Square yards	23,161	46,882	----------	7,770	77,813
Lines:					
Hand	225	463	----------	12	700
Hooks	441	720	----------	24	1,185
Trawl	693	712	----------	2	1,407
Hooks	187,600	420,400	----------	1,300	609,300

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[7] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included in this area craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery which extends into area XXIV. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Middle Atlantic States, 1933—Continued

OPERATING UNITS: BY STATES—Continued

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Apparatus—Continued.					
Lines—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*
Troll	20	404			424
Hooks	20	404			424
Trot with baits or snoods		9			9
Baits or snoods		9,900			9,900
Trot with hooks	14				14
Hooks	1,495				1,495
Pound nets	301	153		32	486
Weirs		88			88
Stop nets	24	65		7	96
Square yards	11,258	50,615		1,820	63,693
Fyke nets	849	1,369		449	2,667
Dip nets	5	34		51	90
Cast nets		3			3
Scap nets	279				279
Drag nets	47	14			61
Yards at mouth	94	28			122
Otter trawls	130	67			197
Yards at mouth	2,791	1,514			4,305
Wire baskets		12			12
Pots:					
Crab		10			10
Eel	3,877	2,571		876	7,324
Lobster	18,340	28,071		165	46,576
Harpoons	18	1			19
Spears	77	92			169
Dredges:					
Clam	14	43		33	90
Yards at mouth	12	48		47	107
Crab	6	69		11	86
Yards at mouth	14	90		20	124
Mussel	2				2
Yards at mouth	2				2
Oyster	78	259		16	353
Yards at mouth	115	309		23	447
Scallop	250	10			260
Yards at mouth	365	34			399
Tongs	837	783		32	1,652
Rakes	568	509			1,077
Forks	271	51			322
Hoes		176			176
Gaffs		2			2

Fisheries of the Middle Atlantic States, 1933—Continued

CATCH: BY STATES[1]

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	218, 257	$5, 023	13, 990	$244	8, 775	$88	1, 148, 980	$4, 786	1, 390, 002	$10, 141
Bluefish	1, 131, 721	56, 097	2, 115, 304	76, 146			4, 720	236	3, 251, 745	132, 479
Bonito	159, 007	9, 541	88, 407	4, 103					247, 414	13, 644
Butterfish	1, 498, 212	61, 339	2, 912, 214	119, 319					4, 410, 426	180, 658
Carp	219, 497	17, 574	143, 471	16, 047	640	64	26, 420	1, 589	390, 028	35, 274
Catfish and bullheads	19, 008	2, 561	55, 380	3, 321			1, 845	116	76, 233	5, 998
Cero			2, 500	75					2, 500	75
Cod	4, 260, 669	112, 583	3, 229, 886	99, 688			2, 240	69	7, 492, 795	212, 340
Crevalle			7, 254	141					7, 254	141
Croaker	80, 147	1, 531	1, 901, 073	44, 945			67, 130	1, 068	2, 048, 350	47, 544
Cusk	3, 500	99							3, 500	99
Dolphin			111	9					111	9
Drum:										
Black	447	9							447	9
Red or redfish			8, 770	126			520	16	9, 290	142
Eels:										
Common	290, 470	27, 446	336, 466	28, 565			53, 140	3, 892	680, 076	59, 903
Conger	5, 260	257	11, 163	432					16, 423	689
Flounders	5, 191, 128	192, 032	4, 051, 797	170, 601			9, 450	492	9, 252, 375	363, 125
Frigate mackerel	81, 886	1, 234	19, 754	243					101, 640	1, 477
Goosefish			10, 000	38					10, 000	38
Grayfish			6, 739	135					6, 739	135
Haddock	8, 506, 679	248, 282							8, 506, 679	248, 282
Hake	139, 954	2, 811	22, 171	360					162, 125	3, 171
Halibut	52, 508	7, 280							52, 508	7, 280
Herring:										
Round			750	8					750	8
Sea	74, 987	610	590, 465	5, 171					665, 452	5, 781
Hickory shad	1, 300	25							1, 300	25
Kingfish or "king mackerel"			140	5					140	5
King whiting or "kingfish"	73, 223	4, 057	84, 039	10, 932					157, 262	14, 989
Mackerel	343, 717	12, 353	318, 047	9, 692					661, 764	22, 045
Menhaden	201, 176	938	45, 774, 117	122, 929			33, 600, 000	111, 700	79, 575, 293	235, 567
Mullet	2, 500	96	82, 747	6, 234			233, 000	2, 390	318, 247	8, 720
Mummichog	25, 050	2, 505	25, 925	1, 939					50, 975	4, 444
Pigfish			203	5					203	5
Pike or pickerel	420	53							420	53
Pollock	770, 231	11, 551	6, 280	94					776, 511	11, 645

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[1] Excluding the seed oyster fishery. The seed oyster fishery in New York, New Jersey, and Delaware was prosecuted by 2,034 fishermen who used 153 vessels, 206 motorboats 152 other boats, 300 dredges, 374 tongs, and 79 rakes; 1,027,040 bushels of seed oysters, valued at $270,112 were taken from public beds, while 78,580 bushels, valued at $77,830, were taken from private beds. Of the total number of persons fishing for seed oysters, 1,881 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 87 vessels, 79 motorboats, 92 other boats, 172 dredges, 327 tongs and 15 rakes.

Fisheries of the Middle Atlantic States, 1933—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Pompano			317	$77					317	$77
Scup or porgy	1, 478, 153	$26, 649	4, 881, 364	65, 293					6, 359, 517	91, 942
Sea bass	505, 688	23, 668	1, 969, 143	63, 601					2, 474, 831	87, 269
Sea robin	18, 758	276	10, 805	109					29, 563	385
Shad	351, 786	28, 761	457, 458	45, 181	2, 217	$392	22, 325	$1, 993	833, 786	76, 327
Sharks	2, 500	35	9, 610	203					12, 110	238
Sheepshead			9	1					9	1
Silversides	18, 500	1, 838	4, 830	676					23, 330	2, 514
Skates	725	7	82, 976	712					83, 701	719
Smelts	245	47							245	47
Spanish mackerel			6, 419	287					6, 419	287
Spot	22, 765	463	473, 565	6, 958			31, 920	903	528, 250	8, 324
Squeteagues or "sea trout":										
Gray	823, 634	38, 147	6, 927, 381	185, 597			123, 180	3, 341	7, 874, 195	227, 085
Spotted			30	2					30	2
Squirrel hake			52, 765	402					52, 765	402
Striped bass	18, 954	2, 724	9, 122	1, 770			11, 700	1, 382	39, 776	5, 876
Sturgeon	1, 851	311	26, 713	2, 130			1, 200	300	29, 764	2, 741
Suckers	28, 624	2, 365	102, 575	8, 462	40, 600	2, 436			171, 799	13, 263
Sunfish	1, 690	132							1, 690	132
Swellfish	2, 000	200							2, 000	200
Swordfish	100, 966	12, 441	1, 600	128					102, 566	12, 569
Tautog	61, 158	1, 584	70, 923	10, 048					132, 081	11, 632
Thimble-eyed mackerel			25, 475	374					25, 475	374
Tilefish	1, 350, 000	67, 500	25	1					1, 350, 025	67, 501
Tomcod	7, 690	338							7, 690	338
Tuna or "horse mackerel"	6, 736	270	36, 492	1, 656					43, 228	1, 926
Whitebait	3, 000	450							3, 000	450
White perch	15, 182	1, 119	29, 420	2, 666			30, 650	1, 490	75, 252	5, 275
Whiting	106, 111	1, 028	2, 040, 544	20, 134			480	30	2, 147, 135	21, 192
Wolffish	25, 625	576							25, 625	576
Yellow perch	1, 857	168					6, 480	398	8, 337	566
Total	28, 305, 152	988, 984	79, 038, 724	1, 138, 015	52, 232	2, 980	35, 375, 380	136, 191	142, 771, 488	2, 266, 170
SHELLFISH, ETC.										
Crabs:										
Hard	149, 383	5, 437	709, 410	18, 356			96, 600	1, 295	955, 393	25, 088
King			2, 183, 772	5, 931			566, 600	595	2, 750, 372	6, 526
Soft	825	225	57, 363	12, 239			36, 000	7, 200	94, 188	19, 664
Lobsters	346, 496	67, 256	364, 220	67, 629			12, 840	2, 568	723, 556	137, 453
Shrimp	59, 912	11, 981	25, 741	3, 328					85, 653	15, 309

Squid	444, 938	6, 696	347, 312	8, 760					792, 250	15, 456
Clams:										
Hard, public [2]	1, 923, 610	271, 295	1, 405, 204	215, 579			191, 300	30, 310	3, 520, 114	517, 184
Hard, private [2]	21, 040	4, 601	70, 461	8, 721			9, 640	1, 898	101, 141	15, 220
Soft, public [3]	222, 150	18, 760	913, 560	45, 752					1, 135, 710	64, 512
Surf or skimmer	379, 500	18, 380	146, 313	5, 732					525, 813	24, 112
Conchs	35, 000	2, 095	54	2					35, 054	2, 097
Mussels, sea	47, 400	3, 150	5, 200	200					52, 600	3, 350
Oysters: [4]										
Market, public, spring	19, 250	2, 662	10, 966	1, 138			39, 600	5, 140	69, 816	8, 940
Market, public, fall	81, 984	9, 512	26, 606	1, 792					108, 590	11, 304
Market, private, spring	2, 761, 525	381, 138	3, 718, 539	282, 883			24, 520	2, 985	6, 504, 584	667, 006
Market, private, fall	3, 229, 025	439, 378	3, 855, 564	301, 288			165, 240	20, 065	7, 249, 829	760, 731
Periwinkles and cockles			100	2					100	2
Scallops:										
Bay	48, 000	17, 100	594	30					48, 594	17, 130
Sea	1, 823, 492	193, 445	373, 589	22, 402					2, 197, 081	215, 847
Terrapin, diamond-back			502	145			410	260	912	405
Turtles, snapper			2, 500	250			8, 504	679	11, 004	929
Bloodworms	9, 250	8, 390	1, 740	1, 505					10, 990	9, 895
Sandworms	3, 500	2, 080	5, 403	4, 645					8, 903	6, 725
Total	11, 606, 280	1, 463, 581	14, 224, 713	1, 008, 309			1, 151, 254	72, 995	26, 982, 247	2, 544, 885
Grand total	39, 911, 432	2, 452, 565	93, 263, 437	2, 146, 324	52, 232	2, 980	36, 526, 634	209, 186	169, 753, 735	4, 811, 055

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[2] Statistics on hard clams are based on yields of 8 pounds of meats to the bushel in New York, 8.96 in New Jersey, and 10 pounds in Delaware.

[3] Statistics on soft clams used in this table are based on yields of 16 pounds of meats to the bushel in New York and 20 pounds in New Jersey.

[4] Statistics on oysters used in this table are based on yields of 7 pounds of meats to the bushel in New York, 8.70 in New Jersey, and 7.88 in Delaware.

NOTE.—Of the total catch in New Jersey, 7,500 pounds of shad, valued at $600, were caught in the St. Johns River in Florida, and 1,447,252 pounds of fishery products, valued at $47,109, were taken in the southern trawl fishery off southern New Jersey, Maryland, Virginia. and North Carolina. Of the total catch in New York, 1,024,291 pounds of fishery products, valued at $35,928, were taken in the southern trawl fishery. The products of the southern trawl fishery consisted principally of croaker, flounders, scup and sea bass.

Industries related to the fisheries of the Middle Atlantic States

OPERATING UNITS, SALARIES, AND WAGES, 1933

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	100	10	----	----	110
On boats	----	92	----	----	92
Total	100	102	----	----	202
Vessels:					
Motor	26	4	----	----	30
Net tonnage	580	49	----	----	629
Boats	----	87	----	----	87
Wholesale and manufacturing:					
Establishments	210	124	49	15	398
Persons engaged:					
Proprietors	184	116	44	14	358
Salaried employees	775	159	113	20	1,067
Wage earners:					
Average for season	1,896	1,381	477	452	4,206
Average for year	1,457	906	396	189	2,948
Paid to salaried employees	$2,164,542	$311,040	$200,846	$12,460	$2,688,888
Paid to wage earners	$2,088,832	$785,657	$403,433	$119,171	$3,397,093
Total salaries and wages	$4,253,374	$1,096,697	$604,279	$131,631	$6,085,981
Fishermen manufacturing	348	157	----	7	512

PRODUCTS MANUFACTURED

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Buffalofish, smoked pounds	440,000	$131,750	----	----	----	----	----	----
Butterfish, smoked do	408,600	100,050	80,896	$20,269	(1)	(1)	----	----
Carp, smoked do	91,000	27,200	(1)	(1)	----	----	----	----
Chubs, cisco, lake herring, and tullibee, smoked pounds	2,495,880	534,914	(1)	(1)	330,000	$93,000	----	----
Cod:								
Fresh fillets [2] do	2,338,182	318,327	(1)	(1)	----	----	----	----
Smoked fillets do	66,305	13,700	(1)	(1)	----	----	----	----
Flounders, fresh fillets [2] pounds	1,224,250	193,433	----	----	----	----	----	----
Haddock, fresh fillets [2] pounds	2,077,771	285,912	(1)	(1)	----	----	----	----
Hake, fresh fillets [2] do	128,172	15,017	(1)	(1)	----	----	----	----
Herring, sea:								
Kippered do	55,100	10,210	(1)	(1)	(3)	(3)	----	----
Bloaters do	(1)	(1)	(1)	(1)	540,000	30,250	----	----
Lake trout, smoked do	90,400	28,650	(1)	(1)	(1)	(1)	----	----
Mackerel, smoked do	77,300	13,602	(1)	(1)	(1)	(1)	----	----
Paddlefish or spoonbill cat, smoked pounds	338,600	155,920	----	----	----	----	----	----
Pollock, fresh fillets [2] pounds	103,526	13,050	----	----	----	----	----	----
Salmon:								
Kippered do	269,000	82,700	(4)	(4)	(1)	(1)	----	----
Smoked do	5,427,102	1,494,928	478,966	130,864	(1)	(1)	----	----
Roe, canned [2] standard cases	860	20,164	----	----	----	----	----	----
Shad, smoked pounds	149,000	30,400	(1)	(1)	(1)	(1)	----	----
Sturgeon, smoked do	1,084,000	548,660	205,987	149,781	(1)	(1)	----	----
Sturgeon, caviar, canned [2] standard cases	3,126	396,824	----	----	----	----	----	----
Whitefish, smoked pounds	1,104,000	297,750	(1)	(1)	340,000	85,200	----	----
Whitefish roe and caviar, canned [2] standard cases	179	6,803	----	----	----	----	----	----
Crabs, king, scrap, and meal [2] tons	----	----	250	9,730	----	----	(1)	(1)
Clams:								
Hard, fresh shucked gallons	----	----	1,875	2,723	4,110	14,495	----	----
Soft, fresh shucked gallons	----	----	16,360	14,902	----	----	----	----
Marine-shell products:								
Buttons [2] gross	512,531	391,109	1,267,703	955,660	(1)	(1)	----	----
Novelties [2]	----	44,066	----	130,619	----	----	----	----

See footnotes at end of table.

Industries related to the fisheries of the Middle Atlantic States—Continued

PRODUCTS MANUFACTURED—Continued

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued.								
Oysters, fresh shucked gallons	265,967	$469,016	372,848	$577,217	60,958	$139,056	39,671	$48,434
Oyster-shell products:								
Poultry feed [2] tons	---------	---------	4,951	41,104	2,978	26,192	(1)	(1)
Lime [2] do	---------	---------	2,083	8,986	1,169	4,208	(1)	(1)
Unclassified products:								
Fillets, fresh and frozen [2] pounds	[5] 245,000	[5] 52,550	(6)	(6)	---------	---------	---------	---------
Smoked do	(6)	(6)	[7] 581,349	[7] 162,675	(6)	(6)	---------	---------
Canned [2] standard cases	[8] 8,420	[8] 88,268	(6)	(6)	---------	---------	---------	---------
Miscellaneous [9]	---------	[10] 471,321	---------	[11] 1,111,401	---------	[12] 702,240	---------	[13] 303,208
Total	---------	6,236,294	---------	3,315,931	---------	1,094,641	---------	351,642
By fishermen:								
Bluefish, smoked pounds	---------	---------	50	2	---------	---------	---------	---------
Eels:								
Smoked do	2,150	537	5,450	1,675	---------	---------	---------	---------
Pickled do	---------	---------	48	14	---------	---------	---------	---------
Herring, sea, smoked pounds	---------	---------	4,900	196	---------	---------	---------	---------
Mackerel, smoked do	---------	---------	100	20	---------	---------	---------	---------
Hake, smoked do	---------	---------	50	5	---------	---------	---------	---------
Whiting, smoked do	---------	---------	50	5	---------	---------	---------	---------
Clams, soft, fresh shucked gallons	---------	---------	6,840	5,244	---------	---------	---------	---------
Scallops:								
Bay, fresh shucked gallons	5,400	17,100	---------	---------	---------	---------	---------	---------
Sea, fresh shucked gallons	204,555	192,647	35,603	33,813	---------	---------	---------	---------
Sturgeon roe, salted pounds	---------	---------	50	33	---------	---------	---------	---------
King-crab scrap tons	---------	---------	214	6,655	---------	---------	80	2,200
Total	---------	210,284	---------	47,662	---------	---------	---------	2,200
Grand total	---------	6,446,578	---------	3,363,593	---------	1,094,641	---------	353,842

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[1] The production of this item is included under "Unclassified products."

[2] Data are for 1934.

[3] Kippered sea herring is included with bloaters.

[4] Kippered salmon is included with smoked salmon.

[5] Includes fresh fillets of bluefish, halibut, mackerel, cusk, red snapper, salmon, sea bass, and wolffish.

[6] This has been included under "Miscellaneous."

[7] Includes smoked bluefish, carp, chubs, cisco, cod, eels, flounders, goosefish, haddock, lake trout, mackerel, sea herring (bloaters), shad, tullibee, and whitefish; and kippered sea herring.

[8] Includes canned clam products, pickled eels, terrapin and turtle products, and sea mussels.

[9] Both 1933 and 1934 data are included in these items.

[10] Includes smoked eels, haddock fillets, and sea herring (bloaters); fish meal; cod-liver oil; menhaden oil and meal; and fresh-water mussel-shell products.

[11] Includes canned hard clams and clam chowder, and oysters; shredded salt cod; fresh-cooked crab meat; fresh fillets of cod, hake and haddock; menhaden products; and fresh-water mussel-shell products.

[12] Includes smoked alewives, butterfish, finnan haddie, lake trout, mackerel, salmon, shad and sturgeon; kippered salmon and shad; and marine-shell products.

[13] Includes menhaden products, oyster-shell products, and king-crab scrap.

NOTE.—Unless otherwise indicated the data are for 1933. The total value of products for the Middle Atlantic States was as follows: By manufacturing establishments, $10,998,508; and by fishermen, $260,146. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting craft, 135 have been included as fishermen and among the total number of persons engaged in the preparation of fishermen's prepared products, 511 have been included as fishermen.

SHAD FISHERY OF THE HUDSON RIVER

The shad fishery of the Hudson River in 1934 was prosecuted by 322 fishermen who used 5 motor boats, 149 other boats, 10 haul seines having a combined length of 1,869 yards, 126 drift gill nets having a total area of 505,050 square yards, 28 stake gill nets having a total area of 27,330 square yards, and 11 fyke nets. The total commercial catch amounted to 141,458 shad having a weight of 438,000 pounds and a value to the fishermen of $36,074. This is a decrease of 8 percent in the number of shad and 11 percent in their value as compared with 1933. The average price per pound received by the fishermen in both 1934 and 1933 was about 8 cents.

Drift gill nets accounted for 69 percent of the weight of the shad taken, while stake gill nets accounted for 29 percent. Small quantities, amounting to 2 percent, were taken by haul seines and fyke nets.

Shad fishery of the Hudson River, 1934

Item	New York			New Jersey			Total		
Fishermen:									
On boats and shore:	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Regular	103	--------	--------	6	--------	--------	109	--------	--------
Casual	177	--------	--------	36	--------	--------	213	--------	--------
Total	280	--------	--------	42	--------	--------	322	--------	--------
Boats:									
Motor	--------	--------	--------	5	--------	--------	5	--------	--------
Other	140	--------	--------	9	--------	--------	149	--------	--------
Apparatus:									
Haul seines	10	--------	--------	--------	--------	--------	10	--------	--------
Length, yards	1,869	--------	--------	--------	--------	--------	1,869	--------	--------
Gill nets:									
Drift	126	--------	--------	--------	--------	--------	126	--------	--------
Square yards	505,050	--------	--------	--------	--------	--------	505,050	--------	--------
Stake	14	--------	--------	14	--------	--------	28	--------	--------
Square yards	2,410	--------	--------	24,920	--------	--------	27,330	--------	--------
Fyke nets	11	--------	--------	--------	--------	--------	11	--------	--------
Shad caught:									
With haul seines	1,020	3,000	$261	--------	--------	--------	1,020	3,000	$261
With drift gill nets	102,281	302,900	23,770	--------	--------	--------	102,281	302,900	23,770
With stake gill nets	1,142	3,500	313	35,360	123,800	$11,310	36,502	127,300	11,623
With fyke nets	1,655	4,800	420	--------	--------	--------	1,655	4,800	420
Total	106,098	314,200	24,764	35,360	123,800	11,310	141,458	438,000	36,074

FISHERIES OF THE CHESAPEAKE BAY STATES

(Area XXIII)[8]

The yield of the commercial fisheries of the Chesapeake Bay States (Maryland and Virginia) during 1934 amounted to 289,010,900 pounds valued at $5,943,410 to the fishermen, representing an increase of 6 percent in volume and 17 percent in value as compared with the catch in the previous year. These fisheries gave employment to 20,591 fishermen, as compared with 20,142 in 1933.

There were 544 fishery wholesale and manufacturing establishments in the two States in 1934, as compared with 502 in 1933. In 1934 these establishments employed 12,517 persons, paid $2,758,749 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $7,826,195. In 1933 the wholesale and manufacturing firms employed 11,596 persons, paid $2,366,762 in salaries and wages, and produced manufactured products valued at $7,245,169.

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[8] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area, craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery, which extends into area XXIV. Data on the operating units and catch of the fisheries of the Chesapeake Bay States have been taken largely from statistics collected by the State fishery agencies of Maryland and Virginia. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Chesapeake Bay States, 1934

SUMMARY OF CATCH

Product	Maryland		Virginia		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	12,325,000	$368,321	198,292,500	$1,847,103	210,617,500	$2,215,424
Shellfish, etc	29,885,000	1,398,166	48,508,400	2,329,820	78,393,400	3,727,986
Total	42,210,000	1,766,487	246,800,900	4,176,923	289,010,900	5,943,410

OPERATING UNITS: BY STATES

Item	Maryland	Virginia	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels	645	1,487	2,132
On boats and shore:			
Regular	4,721	6,010	10,731
Casual	2,310	5,418	7,728
Total	7,676	12,915	20,591
Vessels:			
Steam	-----	26	26
Net tonnage	-----	2,937	2,937
Motor	-----	115	115
Net tonnage	-----	1,688	1,688
Sail	136	-----	136
Net tonnage	1,513	-----	1,513
Total vessels	136	141	277
Total net tonnage	1,513	4,625	6,138
Boats:			
Motor	2,900	3,965	6,865
Other	2,249	3,603	5,852
Accessory boats	-----	96	96
Apparatus:			
Purse seines, menhaden	-----	32	32
Length, yards	-----	9,770	9,770
Haul seines	305	183	488
Length, yards	31,735	51,426	83,161
Gill nets:			
Anchor	64	-----	64
Square yards	16,724	-----	16,724
Drift	272	312	584
Square yards	337,112	214,266	551,378
Stake	3,399	6,802	10,201
Square yards	292,614	390,811	683,425
Lines:			
Hand	10	-----	10
Hooks	20	-----	20
Trot with baits or snoods	1,531	1,437	2,968
Baits or snoods	945,000	1,075,280	2,020,280
Trot with hooks	-----	1	1
Hooks	-----	100	100
Pound nets	531	1,810	2,341
Stop nets	-----	2	2
Square yards	-----	5,310	5,310
Fyke nets	1,900	740	2,640
Dip nets	1,321	2,391	3,712
Otter trawls	-----	25	25
Yards at mouth	-----	742	742
Pots, eel	13,248	335	13,583
Spears	2	-----	2
Scrapes	582	4	586
Yards at mouth	582	4	586
Dredges:			
Crab	-----	200	200
Yards at mouth	-----	347	347
Oyster	374	316	690
Yards at mouth	422	356	778
Tongs:			
Oyster	4,380	4,342	8,722
Other	40	1,017	1,057
Rakes:			
Oyster	-----	34	34
Other	10	121	131
Picks	-----	350	350

Fisheries of the Chesapeake Bay States, 1934—Continued

CATCH: BY STATES

Species	Maryland		Virginia		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	5,233,400	$56,581	5,846,200	$38,973	11,079,600	$95,554
Black bass	32,600	2,615			32,600	2,615
Bluefish	328,900	13,069	936,500	41,975	1,265,400	55,044
Bonito	400	16	19,600	731	20,000	747
Butterfish	452,000	18,337	3,339,300	102,443	3,791,300	120,780
Cabio or crab eater			25,300	1,063	25,300	1,063
Carp	208,700	13,450	251,600	10,695	460,300	24,145
Catfish and bullheads	266,600	10,667	509,800	20.939	776,400	31,606
Cod			1,500	25	1,500	25
Crappie	800	23			800	23
Croaker	2,131,100	32,240	19,942,800	233,670	22,073,900	265,910
Cutlassfish			1,900	5	1,900	5
Dolphin	100	10			100	10
Drum:						
Black			37,500	750	37,500	750
Red or redfish	7,000	92	52,800	966	59,800	1,058
Eels:						
Common	158,400	11,669	115,600	12,054	274,000	23,723
Conger	400	6	2,100	39	2,500	45
Flounders	29,100	1,709	970,600	47,044	999,700	48,753
Gizzard shad	18,700	281	95,400	1,184	114,100	1,465
Haddock			500	4	500	4
Hake			21,400	284	21,400	284
Harvestfish	26,100	708	262,800	11,099	288,900	11,807
Herring, sea			361,400	2,638	361,400	2,638
Hickory shad	13,400	284	94,600	1,923	108,000	2,207
King whiting or "kingfish"	4,700	235	101,600	4,658	106,300	4,893
Mackerel			15,000	1,174	15,000	1,174
Menhaden			143,878,800	600,413	143,878,800	600,413
Minnows			56,600	3,081	56,600	3,081
Mullet	29,000	1,540	85,000	2,823	114,000	4,363
Pigfish			8,900	159	8,900	159
Pike or pickerel	18,600	2,967	4,200	407	22,800	3,374
Scup	39,000	705	692,400	19,031	731,400	19,736
Sea bass	10,000	350	127.000	4,919	137,000	5,269
Sea robin			600	18	600	18
Shad	885,300	89,582	4,104,400	314,960	4,989,700	404,542
Sharks			20,200	483	20.200	483
Silver perch	6,000	145			6,000	145
Skates			10.100	80	10,100	80
Spanish mackerel	700	70	52,200	4,131	52,900	4,201
Spot	62,300	1,912	2,041,200	58,707	2,103,500	60,619
Squeteagues or "sea trout":						
Gray	1,477,700	42,614	13,405,800	253,360	14,883.500	295,974
Spotted	7,900	791	49,100	2,531	57,000	3,322
Striped bass	332,700	37,122	309,800	29,061	642,500	66,183
Sturgeon	200	10	8,300	1,079	8,500	1,089
Suckers	8,300	342	13,300	331	21,600	673
Sunfish	600	22	24,000	600	24,600	622
Swellfish			1,700	59	1,700	59
Tautog	100	5	500	7	600	12
Thimble-eyed mackerel			22,000	345	22,000	345
White perch	419,000	21,303	315,400	12,670	734,400	33,973
Whiting			4,500	68	4,500	68
Yellow perch	115,200	6,849	50,700	3,444	165,900	10,293
Total	12,325,000	368,321	198,292,500	1,847,103	210,617,500	2,215,424
SHELLFISH, ETC.						
Crabs:						
Hard	13,620,900	274,734	22,516,000	464,044	36,136,900	738,778
Soft	2,288,800	215,204	1,370,300	95,982	3,659,100	311,186
Lobsters			100	12	100	12
Clams, hard, public	32,000	3,000	2,609,100	364,370	2,641,100	367,370
Mussels, sea			23,400	540	23,400	540
Oysters:[1]						
Market, public, spring	3,902,300	229,243	4,783,300	291,642	8,685,600	520,885
Market, public, fall	8,685,100	513,154	5,217,500	312,563	13,902,600	825,717
Market, private, spring	567,300	73,065	5,490,800	369,965	6,058,100	443,030
Market, private, fall	762,600	87,421	6,377,200	425,648	7,139,800	513,069
Scallops, sea			1,300	896	1,300	896
Squid	21,000	835	92,800	3,179	113,800	4,014
Terrapin, diamond back	3,000	1,400	23,200	870	26,200	2,270
Turtles, snapper	2,000	110	3,400	109	5,400	219
Total	29,885,000	1,398,166	48,508,400	2,329,820	78,393,400	3,727,986
Grand total	42,210,000	1,766,487	246,800,900	4,176,923	289,010,900	5,943,410

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[1] Statistics on oysters used in this table are based on yields of 6.24 pounds of meats to the bushel for market oysters in Maryland and 6.32 pounds in Virginia.

Fisheries of the Chesapeake Bay States, 1934—Continued

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maryland		Virginia		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard........number..	40, 862, 700	$274, 734	67, 548, 000	$464, 044	108, 410, 700	$738, 778
Soft........do....	9, 155, 200	215, 204	5, 481, 200	95, 982	14, 636, 400	311, 186
Clams, hard........bushels..	4, 000	3, 000	326, 138	364, 370	330, 138	367, 370
Mussels........do....	---------	---------	1, 800	540	1, 800	540
Oysters:						
Market, public, spring....do....	625, 369	229, 243	756, 851	291, 642	1, 382, 220	520, 885
Market, public, fall........do....	1, 391, 843	513, 154	825, 554	312, 563	2, 217, 397	825, 717
Market, private, spring...do....	90, 913	73, 065	868, 797	369, 965	959, 710	443, 030
Market, private, fall......do....	122, 212	87, 421	1, 009, 051	425, 648	1, 131, 263	513, 069
Scallops, sea........do....	---------	---------	217	896	217	896

SEED OYSTER FISHERY

Item	Maryland		Virginia		Total	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels........	4		24		28	
On boats and shore:						
Regular........	---------		1, 005		1, 005	
Casual........	---------		120		120	
Total........	4		1, 149		1, 153	
Vessels:						
Motor........	---------		7		7	
Net tonnage........	---------		69		69	
Sail........	1		---------		1	
Net tonnage........	23		---------		23	
Total vessels........	1		7		8	
Total net tonnage........	23		69		92	
Boats:						
Motor........	---------		558		558	
Other........	---------		36		36	
Apparatus:						
Dredges........	2		8		10	
Yards at mouth........	3		16		19	
Tongs........	---------		1, 131		1, 131	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring........	3, 000	$360	1, 153, 083	$173, 664	1, 156, 083	$174, 024
Seed, public, fall........	3, 000	360	864, 342	130, 348	867, 342	130, 708
Seed, private, spring........	---------	---------	32, 868	1, 643	32, 868	1, 643
Seed, private, fall........	---------	---------	32, 868	1, 644	32, 868	1, 644
Total........	6, 000	720	2, 083, 161	307, 299	2, 089, 161	308, 019

NOTE.—Of the number of persons fishing for seed oysters, 1,005 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 6 vessels, 461 motorboats, 36 other boats, 8 dredges, and 987 tongs.

Industries related to the fisheries of the Chesapeake Bay States, 1934

OPERATING UNITS, SALARIES, AND WAGES

Item	Maryland	Virginia	Total
Transporting:			
Persons engaged:	*Number*	*Number*	*Number*
On vessels	334	637	971
On boats		137	137
Total	334	774	1, 108
Vessels:			
Steam		1	1
Net tonnage		103	103
Motor	156	277	433
Net tonnage	2, 186	3, 150	5, 336
Sail	15		15
Net tonnage	387		387
Total vessels	171	278	449
Total net tonnage	2, 573	3, 253	5, 826
Boats		111	111
Wholesale and manufacturing:			
Establishments	319	225	544
Persons engaged:			
Proprietors	424	265	689
Salaried employees	198	165	363
Wage earners:			
Average for season	5, 977	5, 488	11, 465
Average for year	2, 591	2, 463	5, 054
Paid to salaried employees	$308, 800	$209, 440	$518, 240
Paid to wage earners	$1, 223, 183	$1, 017, 326	$2, 240, 509
Total salaries and wages	$1, 531, 983	$1, 226, 766	$2, 758, 749
Fishermen manufacturing	79	55	134

PRODUCTS MANUFACTURED

Item	Maryland		Virginia	
	Quantity	*Value*	*Quantity*	*Value*
By manufacturing establishments:				
Alewives:				
Salted:				
Corned pounds	(1)	(1)	456, 320	$11, 500
Pickled [2] do	1, 034, 710	$38, 875	(3)	(3)
Tight-pack cut do			341, 600	9, 070
Canned standard cases	17, 951	52, 585	548	1, 459
Roe, canned do	5, 525	29, 917	7, 942	36, 805
Dry scrap tons	(3)	(3)	370	12, 008
Oil gallons	(1)	(1)	12, 750	1, 430
Croaker:				
Fresh fillets pounds			37, 500	3, 630
Fresh, pandressed do			560, 000	30, 150
Flounders, fresh fillets do			32, 000	5, 800
Haddock, fresh fillets do			9, 500	1, 350
Menhaden products:				
Dry scrap and meal tons			17, 645	565, 354
Oil gallons			1, 253, 924	248, 401
Sea bass, fresh fillets pounds			41, 500	6, 225
Squeteagues:				
Fresh fillets do			105, 000	8, 880
Fresh, pandressed do			965, 000	54, 350
Crabs, blue:				
Meat, packaged, fresh cooked do	2, 124, 687	704, 576	1, 656, 798	634, 812
Dry scrap tons	(3)	(3)	1, 183	18, 285
Clams, hard, fresh shucked gallons			3, 778	6, 254
Oysters, fresh shucked do	1, 988, 799	2, 017, 691	1, 990, 505	2, 193, 455
Oyster-shell products:				
Poulty feed tons	35, 602	178, 443	10, 689	57, 235
Lime do	21, 346	35, 483	9, 376	26, 786
Lime, "burned" do			9, 277	51, 510
Unclassified products:				
Canned standard cases	[4] 42, 294	[4] 183, 976	(1)	(1)
Scrap and meal tons	[5] 680	[5] 12, 690	[6] 2, 459	[6] 45, 481
Miscellaneous		[7] 500, 514		[8] 41, 215
Total		3, 754, 750		4, 071, 445

See footnotes at end of table.

Industries related to the fisheries of the Chesapeake Bay States, 1934—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maryland		Virginia	
	Quantity	*Value*	*Quantity*	*Value*
By fishermen:				
Alewives:				
Corned ... pounds			16,000	$320
Pickled ... do	8,300	$326	1,000	30
Eels:				
Smoked ... do	400	100		
Salted ... do	102,152	6,922		
Sturgeon roe, salted ... do	30	15	287	258
Oysters, fresh shucked ... gallons			3,746	3,057
Scallops, sea, fresh shucked ... do			148	200
Total		7,363		3,865
Grand total		3,762,113		4,075,310

[1] The production of this item is included under "Miscellaneous."

[2] This item is usually an intermediate product, and, although included in the total, may be shown in its final stage of processing in this or another State.

[3] The production of this item is included under "Unclassified products."

[4] Includes canned hard-clam chowder, oysters, and terrapins.

[5] Includes alewife dry scrap and blue-crab meal.

[6] Includes menhaden acid scrap, and miscellaneous dry and acidulated scrap.

[7] Includes corned alewives; smoked alewives, butterfish, carp, chub, cisco, eels, herring, salmon, sturgeon, tullibees, and whitefish; herring, bloaters; kippered salmon; alewife oil; marine-shell products; and pearl essence.

[8] Includes salted tight-pack alewife roe; pickled alewives; pan-dressed frozen croaker and squeteagues; menhaden oil; and canned blue crabs.

NOTE.—The total value of manufactured products in the Chesapeake Bay States was as follows: By manufacturing establishments, $7,826,195; and by fishermen, $11,228. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting vessels and boats, 483 have been included as fishermen, and among the total number of persons engaged in the preparation of fishermen's prepared products, all have been included as fishermen.

MARYLAND

Fisheries of Maryland, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Lines		Pound nets	Fyke nets	Dip nets
		Anchor	Drift	Stake	Hand	Trot with baits or snoods			
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	362	6	38	103	10	1,088	369	55	740
Casual	298	3	331	109		180	126	69	581
Total	660	9	369	212	10	1,268	495	124	1,321
Boats:									
Motor	138	7	84	92	5	1,120	175	48	15
Other	204	3	129	70		139	165	78	1,230
Apparatus:									
Number	305	64	272	3,399	10	1,531	531	1,900	1,321
Length, yards	31,735								
Square yards		16,724	337,112	292,614					
Hooks, baits, or snoods					20	945,000			

Fisheries of Maryland, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pots, eel	Spears	Scrapes	Dredges, oyster	Tongs		Rakes, other than for oysters	By hand, other than for oysters	Total, exclusive of duplication
					Oyster	Other			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				645					645
On boats and shore:									
Regular	125	2	321	88	3, 550	40	10	24	4, 721
Casual	29				828				2, 310
Total	154	2	321	733	4, 378	40	10	24	7, 676
Vessels, sail				136					136
Net tonnage				2,513					1,513
Boats:									
Motor	122			19	2, 035	13			2, 900
Other	33	1	286	32	149	35	10	10	2, 249
Apparatus:									
Number	13, 248	2	582	374	4, 380	40	10		
Yards at mouth			582	422					

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	61, 900	$733			8, 800	$191	32, 100	$776
Black bass	17, 700	1, 370					600	48
Bluefish	91, 900	2, 495			45, 000	2, 650	8, 600	437
Butterfish	2, 100	78						
Carp	178, 900	11, 914			300	10	1, 000	44
Catfish and bullheads	60, 600	2, 498					600	31
Crappie	100	4					200	8
Croaker	273, 400	3, 609			2, 100	47	12, 800	281
Drum, red or redfish	2, 700	27						
Eels, common	2, 200	153						
Flounders	900	42						
Gizzard shad	4, 200	43						
Mullet					29, 000	1, 540		
Pike or pickerel	6, 200	1, 093					1, 200	242
Shad	1, 100	83	16, 400	$1, 730	227, 100	20, 944	94, 900	9, 950
Silver perch	5, 800	139						
Spot	12, 700	424			2, 300	67	700	29
Squeteagues or "sea trout":								
Gray	202, 700	7, 955			6, 800	316	3, 500	219
Spotted	7, 500	750						
Striped bass	77, 000	8, 322	6, 500	797	42, 500	4, 788	53, 300	6, 318
Suckers	3, 200	126					400	13
Sunfish	300	12					300	10
White perch	57, 100	3, 052			8, 400	660	38, 300	2, 369
Yellow perch	20, 100	1, 133					500	43
Crabs, soft	205, 500	26, 527						
Total	1, 295, 800	72, 582	22, 900	2, 527	372, 300	31, 213	249, 000	20, 818

Fisheries of Maryland, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Fyke nets	
	Hand		Trot with baits or snoods					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					5, 127, 500	$54, 817	3, 100	$64
Black bass					100	7	14, 200	1, 190
Bluefish	50, 000	$2, 500			132, 400	4, 957	1, 000	30
Bonito	400	16						
Butterfish					449, 900	18, 259		
Carp					16, 200	731	12, 300	751
Catfish and bullheads					78, 800	2, 974	126, 600	5, 164
Crappie							500	11
Croaker					1, 835, 800	28, 163	7, 000	140
Dolphin	100	10						
Drum, red or redfish					4, 300	65		
Eels:								
Common					9, 700	699	8, 100	618
Conger	400	6						
Flounders	1, 000	80			27, 000	1, 573	200	14
Gizzard shad					14, 500	238		
Harvestfish					26, 100	708		
Hickory shad					13, 400	284		
King whiting or "kingfish"					4, 700	235		
Pike or pickerel					2, 400	350	8, 800	1, 282
Scup	2, 500	50			36, 500	655		
Sea bass	10, 000	350						
Shad					543, 800	56, 703		
Silver perch							200	6
Spanish mackerel					700	70		
Spot					46, 100	1, 377	500	15
Squeteagues or "sea trout":								
Gray	2, 500	250			1, 259, 600	33, 744	2, 600	130
Spotted					400	41		
Striped bass					148, 900	16, 343	4, 500	554
Sturgeon					200	10		
Suckers					1, 000	51	3, 700	152
Tautog	100	5						
White perch					180, 700	8, 734	134, 500	6, 488
Yellow perch					10, 100	568	84, 500	5, 105
Crabs, hard			13, 010, 800	$262, 532				
Squid					21, 000	835		
Turtles, snapper							2, 000	110
Total	67, 000	3, 267	13, 010, 800	262, 532	9, 991, 800	233, 191	414, 300	21, 824

Species	Dip nets		Pots, eel		Spears		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			136, 600	$10, 019	1, 800	$180		
Shad	2, 000	$172						
Crabs:								
Hard	3, 500	70					606, 600	$12, 132
Soft	1, 364, 300	129, 566					719, 000	59, 111
Total	1, 369, 800	129, 808	136, 600	10, 019	1, 800	180	1, 325, 600	71, 243

Species	Dredges		Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public			28, 800	$2, 700	2, 600	$240	600	$60
Oysters:								
Market, public, spring	613, 700	$34, 936	3, 288, 600	194, 307				
Market, public, fall	2, 467, 700	138, 683	6, 217, 400	374, 471				
Market, private, spring	38, 600	6, 775	528, 700	66, 290				
Market, private, fall	47, 500	9, 120	715, 100	78, 301				
Terrapin, diamond back							3, 000	1, 400
Total	3, 167, 500	189, 514	10, 778, 600	716, 069	2, 600	240	3, 600	1, 460

Fisheries of Maryland, 1934—Continued

OPERATING UNITS: BY COUNTIES

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	-	13	8	-	-	-	200	-
On boats and shore:								
Regular	498	8	203	10	34	115	769	[illegible]
Casual	365	66	83	29	79	222	159	55
Total	863	87	294	39	113	337	1, 128	60
Vessels, sail	-	3	2	-	-	-	40	-
Net tonnage	-	64	32	-	-	-	356	-
Boats:								
Motor	345	23	103	5	40	140	499	24
Other	240	43	128	17	40	80	145	16
Apparatus:								
Haul seines	50	11	1	4	24	19	5	10
Length, yards	1, 630	3, 450	135	1, 150	5, 920	3, 270	1, 750	3, 150
Gill nets:								
Anchor	-	-	-	-	64	-	-	-
Square yards	-	-	-	-	16, 724	-	-	-
Drift	2	-	1	20	25	35	24	24
Square yards	1, 500	-	600	2, 620	32, 750	120, 323	25, 293	35, 494
Stake	8	26	5	60	62	1, 014	175	276
Square yards	1, 064	1, 212	400	1, 666	2, 482	74, 971	6, 300	47, 070
Lines:								
Trot with baits or snoods	85	36	41	-	-	24	543	-
Baits or snoods	45, 000	17, 800	18, 500	-	-	22, 000	245, 000	-
Pound nets	23	15	13	10	25	32	114	4
Fyke nets	4	240	-	16	701	52	9	280
Dip nets	182	-	111	-	-	29	99	-
Pots, eel	250	411	-	75	500	46	3, 548	87
Dredges, oyster	-	6	4	-	-	-	90	-
Yards at mouth	-	9	5	-	-	-	102	-
Tong, oyster	755	-	240	-	-	188	624	-

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	-	-	-	4	364	56	-	-
On boats and shore:								
Regular	378	-	542	457	750	544	292	116
Casual	234	23	111	267	153	192	147	125
Total	612	23	653	728	1, 267	792	439	241
Vessels, sail	-	-	-	1	78	12	-	-
Net tonnage	-	-	-	10	960	91	-	-
Boats:								
Motor	211	3	233	272	350	399	163	90
Other	156	12	112	265	556	220	69	150
Apparatus:								
Haul seines	73	8	73	6	12	1	1	7
Length, yards	4, 142	845	2, 365	1, 205	1, 008	250	500	965
Gill nets:								
Drift	21	8	-	-	11	3	77	21
Square yards	42, 105	12, 385	-	-	2, 680	4, 394	53, 050	3, 918
Stake	1, 048	3	35	-	211	60	416	-
Square yards	125, 460	600	4, 104	-	3, 940	6, 705	16, 640	-
Lines:								
Hand	-	-	-	-	-	-	-	10
Hooks	-	-	-	-	-	-	-	20
Trot with baits or snoods	113	-	92	136	74	259	7	121
Baits or snoods	65, 500	-	69, 000	130, 800	53, 200	192, 000	5, 600	80, 600
Pound nets	24	2	8	73	48	102	19	19
Fyke nets	408	60	50	-	42	18	20	-
Dip nets	50	-	100	200	359	160	-	31
Pots, eel	784	41	1, 290	18	-	6, 092	6	100
Spears	-	-	-	-	-	-	-	2
Scrapes	-	-	-	-	582	-	-	-
Yards at mouth	-	-	-	-	582	-	-	-
Dredges, oyster	-	-	-	2	220	24	-	28
Yards at mouth	-	-	-	2	256	28	-	20
Tongs:								
Oyster	377	-	562	471	339	396	316	112
Other	-	-	-	-	-	-	-	40
Rakes, other than for oysters	-	-	-	-	-	-	-	10

Fisheries of Maryland, 1934—Continued

CATCH: BY COUNTIES

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	371, 500	$4, 100	37, 300	$646	157, 000	$1, 670	8, 800	$146
Black bass	--------	--------	200	30	--------	--------	--------	--------
Bluefish	126, 600	2, 500	9, 400	386	2, 100	210	1, 800	90
Butterfish	2, 400	96	--------	--------	--------	--------	--------	--------
Carp	2, 400	161	13, 900	878	600	42	10, 400	822
Catfish and bullheads	700	31	17, 800	759	9, 600	322	5, 600	223
Croaker	125, 400	2, 022	3, 300	129	23, 000	440	500	10
Eels, common	16, 600	1, 020	7, 900	483	100	11	2, 200	111
Flounders	500	27	200	10	400	30	--------	--------
Gizzard shad	2, 500	25	4, 100	60	400	8	5, 000	100
Harvestfish	500	12	--------	--------	--------	--------	--------	--------
Hickory shad	300	11	700	14	--------	--------	--------	--------
Pike or pickerel	--------	--------	600	100	300	39	--------	--------
Shad	27, 400	2, 738	1, 000	120	25, 400	3, 801	2, 300	240
Spot	9, 400	248	4, 500	96	600	38	--------	--------
Squeteagues or "sea trout", gray	258, 500	12, 686	4, 700	362	8, 800	536	5, 500	325
Striped bass	4, 400	520	12, 600	1, 554	1, 200	127	15, 000	1, 814
Suckers	--------	--------	--------	--------	900	62	100	9
White perch	2, 000	92	77, 400	3, 774	4, 800	321	19, 700	1, 256
Yellow perch	200	13	11, 700	709	2, 800	168	800	48
Crabs:								
Hard	439, 000	8, 780	156, 500	6, 156	160, 000	3, 600	--------	--------
Soft	67, 100	7, 479	--------	--------	80, 800	8, 623	--------	--------
Oysters:								
Market, public, spring	546, 900	36, 445	14, 400	789	73, 900	4, 926	--------	--------
Market, public, fall	1, 039, 000	69, 741	109, 200	5, 880	238, 900	15, 777	--------	--------
Market, private, spring	--------	--------	--------	--------	63, 000	5, 375	--------	--------
Market, private, fall	--------	--------	--------	--------	54, 000	4, 500	--------	--------
Total	3, 043, 300	148, 747	487, 400	22, 935	908, 600	50, 626	77, 700	5, 194

Species	Cecil		Charles		Dorchester		Hartford	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	494, 500	$3, 331	5, 300	$120	275, 400	$3, 774	113, 000	$1, 010
Black bass	19, 500	1, 488	2, 100	210	--------	--------	6, 600	480
Bluefish	--------	--------	200	8	25, 300	1, 537	--------	--------
Butterfish	--------	--------	--------	--------	3, 400	158	--------	--------
Carp	22, 900	1, 503	52, 300	2, 481	5, 500	240	46, 100	3, 897
Catfish and bullheads	66, 000	2, 554	25, 400	1, 021	9, 700	466	32, 700	1, 340
Crappie	600	15	--------	--------	--------	--------	200	8
Croaker	--------	--------	6, 100	126	171, 600	2, 568	--------	--------
Drum, red or redfish	--------	--------	--------	--------	600	12	--------	--------
Eels, common	8, 500	482	2, 700	266	58, 700	4, 696	3, 700	236
Flounders	--------	--------	100	3	9, 300	358	--------	--------
Gizzard shad	300	6	3, 400	27	200	4	--------	--------
Hickory shad	200	4	--------	--------	200	4	--------	--------
Pike or pickerel	8, 600	1, 232	1, 100	191	--------	--------	5, 300	1, 002
Shad	78, 900	8, 573	23, 100	2, 363	78, 000	6, 904	31, 900	3, 361
Silver perch	--------	--------	1, 800	59	--------	--------	--------	--------
Spot	--------	--------	100	3	2, 000	81	--------	--------
Squeteagues or "sea trout", gray	--------	--------	8, 700	541	36, 300	1, 349	--------	--------
Striped bass	29, 500	3, 229	34, 800	4, 361	19, 900	2, 269	18, 800	2, 398
Sturgeon	200	10	--------	--------	--------	--------	--------	--------
Suckers	1, 400	50	100	3	--------	--------	1, 600	37
Sunfish	--------	--------	--------	--------	--------	--------	600	22
White perch	61, 200	2, 943	21, 900	1, 277	47, 300	1, 822	33, 700	1, 680
Yellow perch	47, 300	2, 368	3, 300	194	--------	--------	22, 000	1, 293
Crabs:								
Hard	--------	--------	227, 000	4, 300	3, 486, 800	69, 736	--------	--------
Soft	--------	--------	3, 500	470	219, 900	17, 587	--------	--------
Oysters:								
Market, public, spring	--------	--------	77, 000	4, 806	450, 100	26, 320	--------	--------
Market, public, fall	--------	--------	105, 300	6, 744	1, 043, 200	60, 778	--------	--------
Terrapin, diamond back	--------	--------	--------	--------	1, 000	500	--------	--------
Turtles, snapper	2, 000	110	--------	--------	--------	--------	--------	--------
Total	841, 600	27, 898	605, 300	29, 574	5, 944, 400	201, 163	316, 200	16, 764

Fisheries of Maryland, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	133,300	$1,898	1,000	$20	23,900	$284	287,400	$2,87
Black bass	200	20	3,900	380				
Bluefish	16,800	692			3,700	170	16,100	86
Butterfish	700	23					2,800	13
Carp	8,300	265	28,100	1,881	12,000	942	700	3
Catfish and bullheads	37,300	1,490	12,800	510	5,100	198	1,600	74
Croaker	373,000	5,999			7,100	203	85,200	1,509
Eels, common	7,200	574	300	22	5,000	541	1,700	91
Flounders	100	5					3,200	18
Gizzard shad	900	18					500	
Hickory shad	100	2					2,300	52
Pike or pickerel	2,300	355	400	48				
Shad	97,900	10,000	3,200	335	1,400	155	71,900	6,304
Silver perch			4,200	86				
Spot	4,700	162			100	4	9,100	273
Squeteagues or "sea trout", gray	57,800	2,640	100	4			36,900	1,492
Striped bass	98,400	10,187	700	76	3,200	459	36,000	3,977
Suckers	500	28	2,000	80	600	18		
White perch	97,000	4,873	2,300	185	6,000	355	5,000	330
Yellow perch	14,500	721	1,800	136	8,800	1,057	100	8
Crabs:								
Hard	430,300	8,606			596,400	11,968	770,000	15,400
Soft	113,100	14,519			98,200	19,566	88,000	7,880
Oysters:								
Market, public, spring	396,500	23,128			816,200	47,614	197,700	10,033
Market, public, fall	834,200	48,660			1,707,100	99,622	285,800	14,417
Market, private, spring							87,000	6,525
Market, private, fall							78,000	6,500
Total	2,725,100	134,865	60,800	3,763	3,294,800	183,156	2,067,000	78,962

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	345,700	$3,807	2,856,900	$31,629	57,400	$659	65,000	$608
Black bass					100	7		
Bluefish	5,700	369	51,900	2,906	10,500	325	58,800	3,015
Bonito							400	16
Butterfish	6,200	415			1,500	110	435,000	17,400
Carp	500	21	1,300	74	3,700	208		
Catfish and bullheads	9,800	416	7,600	323	23,400	865	1,500	75
Croaker	309,300	3,048	200,600	3,716	25,000	450	801,000	12,020
Dolphin							100	10
Drum, red or redfish	2,700	27					3,700	53
Eels:								
Common	1,700	86	33,500	2,370	2,300	145	6,300	535
Conger							400	6
Flounders	3,800	228	2,300	124	5,200	414	4,000	330
Gizzard shad					1,400	26		
Harvestfish	1,600	126			9,000	270	15,000	300
Hickory shad	6,100	91	3,000	88	200	4	300	14
King whiting or "kingfish"							4,700	235
Mullet							29,000	1,540
Scup							39,000	705
Sea bass							10,000	350
Shad	95,300	8,857	208,600	24,164	116,100	9,724	22,900	1,943
Spanish mackerel							700	70
Spot	6,600	260	2,200	74	1,200	26	21,800	647
Squeteagues or "sea trout":								
Gray	139,900	4,961	30,300	1,468	34,500	1,005	855.700	15,245
Spotted	7,900	791						
Striped bass	4,100	436	22,900	2,346	31,200	3,369		
Suckers			200	10			900	45
Tautog							100	5
White perch	8,200	435	12,100	631	17,900	1,159	2,500	170
Yellow perch			1,200	88	700	46		
Crabs:								
Hard	2,622,900	52,458	3,536,800	69,842	40,000	800	1,155,200	23,088
Soft	1,458,700	119,388	115,700	16,192			43,800	3,500
Clams, hard, public							32,000	3,000
Oysters:								
Market, public, spring	786,600	43,509	457,600	26,694	85,400	4,979		
Market, public, fall	2,246,600	128,778	959,200	55,953	116,600	6,804		
Market, private, spring	52,900	2,848			146,700	8,557	217,700	49,760
Market, private, fall	168,500	10,521			233,300	13,608	228,800	52,292
Squid							21,000	835
Terrapin, diamond back	2,000	900						
Total	8,293,300	382,776	8,503,900	238,692	963,300	53,560	4,077,300	187,812

Fisheries of Maryland, 1934—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Oyster dredges	
OPERATING UNITS	*Number*	
ishermen, on vessels	4	
essels, sail	1	
Net tonnage	23	
pparatus, number	2	
Yards at mouth	3	
CATCH	*Bushels*	*Value*
ysters, seed, public, spring	3,000	$360
ysters, seed, public, fall	3,000	360
Total	6,000	720

NOTE.—Of the persons and gear employed in the seed oyster fishery all are duplicated among those in he market oyster fishery or fisheries for other species. The seed oyster fishery of Maryland was confined o Calvert County.

VIRGINIA

Fisheries of Virginia, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets		Lines		Pound nets	Stop nets
			Drift	Stake	Trot with baits or snoods	Trot with hooks		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1,102							
On boats and shore:								
Regular		275	66	126	968		1,524	2
Casual		294	460	189	475	1	514	2
Total	1,102	569	526	315	1,443	1	2,038	4
Vessels:								
Steam	26							
Net tonnage	2,937							
Motor	6							
Net tonnage	446							
Total vessels	32							
Total net tonnage	3,383							
Boats:								
Motor		53	50	115	853		391	2
Other		154	264	68	484	1	455	
Accessory boats	96							
Apparatus:								
Number	32	183	312	6,802	1,437	1	1,810	2
Length, yards	9,770	51,426						5,310
Square yards			214,266	390,811				
Hooks, baits, or snoods					1,075,280	100		

Item	Fyke nets	Dip nets	Otter trawls	Pots, eel	Scrapes	Dredges	
						Crab	Oyster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			96			230	83
On boats and shore:							
Regular	53	971		8	4	89	247
Casual	93	1,420		3			
Total	146	2,391	96	11	4	319	330
Vessels:							
Motor			25			74	18
Net tonnage			361			712	274
Boats:							
Motor	40	110		5		31	140
Other	56	1,813		6	4		
Apparatus:							
Number	740	2,391	25	335	4	200	316
Yards at mouth			742		4	347	356

Fisheries of Virginia, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Tongs		Rakes		Picks	By hand		Total, exclusive of duplication
	Oyster	Other	Oyster	Other		Oysters	Other	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	6							1,487
On boats and shore:								
Regular	2,860	869	34	111	350	214	574	6,010
Casual	2,263	148		10		112	112	5,418
Total	5,129	1,017	34	121	350	326	686	12,915
Vessels:								
Steam								26
Net tonnage								2,937
Motor	2							115
Net tonnage	11							1,688
Total vessels	2							141
Total net tonnage	11							4,625
Boats:								
Motor	2,508	500		11	16	107	112	3,965
Other	684	171		101	296	156	261	3,603
Accessory boats								96
Apparatus, number	4,342	1,017	34	121	350			

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			191,400	$2,203	46,000	$883	7,500	$33
Bluefish			146,400	3,575	1,000	28		
Butterfish			2,400	48				
Carp			146,900	6,895	900	32	400	16
Catfish and bullheads			75,500	2,624	1,300	44		
Croaker			1,264,900	16,172	30,000	300	4,600	97
Drum, red or redfish			800	31				
Eels, common			31,600	5,800				
Flounders			6,300	216			2,500	100
Gizzard shad			35,100	443	20,000	50		
Hickory shad			2,300	78	200	2		
Menhaden	143,009,600	$596,380						
Minnows			56,600	3,081				
Mullet			47,100	2,023	1,000	18	12,700	395
Pigfish			1,000	10				
Pike or pickerel			1,200	120				
Shad			13,000	1,579	213,500	20,269	299,200	30,554
Spanish mackerel			400	40				
Spot			871,400	25,782	22,200	488	800	23
Squeteagues or "sea trout":								
Gray			156,800	5,315	1,000	30	2,200	127
Spotted			43,100	2,395	4,500	68		
Striped bass			43,500	3,048	26,900	2,884	34,600	3,624
Suckers			12,000	300				
Sunfish			24,000	600				
White perch			48,600	2,165	300	24	300	13
Yellow perch			16,400	1,047			200	12
Terrapin, diamond back			500	30				
Turtles, snapper			1,400	29				
Total	143,009,600	596,380	3,240,600	85,649	368,800	25,120	365,000	34,994

Fisheries of Virginia, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Stop nets	
	Trot with baits or snoods		Trot with hooks					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					5, 540, 300	$35, 354		
Bluefish					786, 200	38, 204		
Bonito					19, 600	731		
Butterfish					3, 303, 500	101, 269		
Cabio or crab eater					25, 300	1, 063		
Carp					46, 500	1, 462	7, 100	$173
Catfish and bullheads			1, 000	$30	210, 700	9, 095	15, 000	275
Cod					1, 000	10		
Croaker					15, 700, 100	166, 118		
Cutlassfish					1, 900	5		
Drum:								
Black					37, 500	750		
Red or redfish					44, 000	793		
Eels, common					45, 100	3, 910		
Flounders					472, 200	18, 515		
Gizzard shad					33, 500	650		
Harvestfish					262, 800	11, 099		
Herring, sea					361, 400	2, 638		
Hickory shad					91, 400	1, 827		
King whiting or "kingfish"					59, 700	3, 076		
Mackerel					14, 900	1, 170		
Menhaden					869, 200	4, 033		
Mullet					23, 600	369		
Pigfish					7, 300	136		
Scup					32, 900	790		
Sea bass					11, 100	180		
Shad					3, 543, 300	258, 144		
Spanish mackerel					51, 800	4, 091		
Spot					1, 101, 400	31, 550		
Squeteagues or "sea trout":								
Gray					12, 950, 800	239, 328		
Spotted					1, 500	68		
Striped bass					181, 800	17, 247		
Sturgeon					4, 200	663		
Thimble-eyed mackerel					22, 000	345		
White perch					147, 000	5, 980		
Whiting					3, 000	38		
Yellow perch					5, 000	265		
Crabs, hard	16, 862, 400	$286, 607						
Squid					84, 700	2, 958		
Total	16, 862, 400	286, 607	1, 000	30	46, 103, 200	963, 924	22, 100	448

Species	Fyke nets		Dip nets		Otter trawls		Pots, eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	60, 100	$478	900	$22				
Bluefish					2, 900	$168		
Butterfish	1, 500	51			26, 900	1, 075		
Carp	49, 700	2, 114	100	3				
Catfish and bullheads	205, 100	8, 801	300	7			900	$63
Cod					500	15		
Croaker	106, 100	1, 894			2, 837, 100	49, 089		
Drum, red or redfish					8, 000	142		
Eels:								
Common	9, 800	598					29, 100	1, 746
Other					2, 100	39		
Flounders	15, 300	708			474, 300	27, 505		
Gizzard shad	6, 800	41						
Haddock					500	4		
Hake					21, 400	284		
Hickory shad			700	16				
King whiting or "kingfish"					41, 900	1, 582		
Mackerel					100	4		
Mullet	600	18						
Pigfish					600	13		
Pike or pickerel	3, 000	287						
Scup					659, 500	18, 241		
Sea bass					115, 900	4, 739		
Sea robin					600	18		
Shad	35, 400	4, 414						
Sharks					20, 200	483		
Skates					10, 100	80		

Fisheries of Virginia, 1934—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Dip nets		Otter trawls		Pots, eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Spot					45, 400	$864		
Squeteagues or "sea trout", gray	19, 200	$762			275, 800	7, 798		
Striped bass	22, 300	2, 176			700	82		
Sturgeon					4, 100	416		
Suckers	1, 000	20	300	$11				
Swellfish					1, 700	59		
Tautog					500	7		
White perch	116, 900	4, 460			2, 300	28		
Whiting					1, 500	30		
Yellow perch	29, 100	2, 120						
Crabs:								
Hard			46, 500	5, 575	4, 400	73		
Soft			1, 359, 700	95, 596				
Lobsters					100	12		
Squid					8, 100	221		
Turtles, snapper	2, 000	80						
Total	683, 900	29, 022	1, 408, 500	101, 230	4, 567, 200	113, 071	30, 000	$1, 809

Species	Scrapes		Dredges				Tongs			
			Crab		Oyster		Oyster		Other	
	Lb.	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*
Crabs:										
Hard	5, 900	$53	5, 596, 800	$171, 736						
Soft	10, 600	386								
Clams, hard, public									1, 614, 700	$149, 818
Oysters:										
Market, public, spring							4, 783, 300	$291, 642		
Market, public, fall							5, 217, 500	312, 563		
Market, private, spring					2, 451, 800	$181, 550	2, 882, 900	183, 559		
Market, private, fall					3, 851, 800	276, 983	2, 369, 300	141, 808		
Scallops, sea			1, 300	896						
Total	16, 500	439	5, 598, 100	172, 632	6, 303, 600	458, 533	15,253,000	929, 572	1, 614, 700	149, 818

Species	Rakes				Picks		By hand			
	Oyster		Other				Oysters		Other	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public			168, 000	$24, 558	269, 400	$40, 416			557, 000	$149, 578
Mussels									23, 400	540
Oysters:										
Market, private, spring	102, 000	$1, 700					54, 100	$3, 156		
Market, private, fall	102, 000	3, 700					54, 100	3, 157		
Terrapin, diamond back									22, 700	840
Total	204, 000	5, 400	168, 000	24, 558	269, 400	40, 416	108, 200	6, 313	603, 100	150, 958

Fisheries of Virginia, 1934—Continued

OPERATING UNITS: BY COUNTIES

Item	Accomac	Arlington	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	6	--------	--------	--------	--------	--------	127	--------
On boats and shore;								
Regular	1,260	4	--------	8	--------	5	120	39
Casual	274	10	3	118	22	6	--------	163
Total	1,540	14	3	126	22	11	247	202
Vessels:								
Motor	2	--------	--------	--------	--------	--------	32	--------
Net tonnage	38	--------	--------	--------	--------	--------	417	--------
Boats:								
Motor	626	7	--------	9	--------	--------	32	37
Other	583	1	3	62	13	5	12	71
Apparatus:								
Haul seines	32	--------	--------	6	2	4	--------	2
Length, yards	14,010	--------	--------	1.225	300	420	--------	400
Gill nets:								
Drift	--------	7	2	51	11	1	--------	4
Square yards	--------	16,450	800	18,335	3,360	520	--------	1,310
Stake	2	--------	--------	643	--------	--------	--------	--------
Square yards	720	--------	--------	19,640	--------	--------	--------	--------
Lines, trot with baits or snoods	193	--------	--------	--------	--------	--------	11	1
Baits or snoods	204,900	--------	--------	--------	--------	--------	3,450	250
Pound nets	208	--------	--------	--------	--------	--------	123	2
Fyke nets	4	--------	1	32	2	10	2	2
Dip nets	182	--------	--------	--------	--------	4	--------	--------
Otter trawls	--------	--------	--------	--------	--------	--------	11	--------
Yards at mouth	--------	--------	--------	--------	--------	--------	326	--------
Pots, eel	--------	--------	--------	10	--------	--------	--------	--------
Scrapes	4	--------	--------	--------	--------	--------	--------	--------
Yards at mouth	4	--------	--------	--------	--------	--------	--------	--------
Dredges:								
Crab	25	--------	--------	--------	--------	--------	36	--------
Yards at mouth	28	--------	--------	--------	--------	--------	71	--------
Oyster	274	--------	--------	--------	--------	--------	6	--------
Yards at mouth	275	--------	--------	--------	--------	--------	9	--------
Tongs:								
Oyster	875	--------	--------	--------	--------	--------	14	137
Other	317	--------	--------	--------	--------	--------	14	--------
Rakes:								
Oyster	34	--------	--------	--------	--------	--------	--------	--------
Other	87	--------	--------	--------	--------	--------	--------	--------
Picks	350	--------	--------	--------	--------	--------	--------	--------

Item	Fairfax	Gloucester	Henrico	Isle of Wight	James City	King and Queen	King George	King William
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	23	--------	3	--------	--------	--------	--------
On boats and shore:								
Regular	12	351	--------	336	29	--------	25	--------
Casual	46	40	87	34	70	87	102	93
Total	58	414	87	373	99	87	127	93
Vessels:								
Motor	--------	8	--------	1	--------	--------	--------	--------
Net tonnage	--------	79	--------	5	--------	--------	--------	--------
Boats:								
Motor	16	168	--------	179	23	12	71	3
Other	15	52	44	77	32	52	57	50
Apparatus:								
Haul seines	3	--------	7	8	6	2	4	4
Length, yards	700	--------	196	1,600	1,200	400	950	390
Gill nets:								
Drift	14	--------	35	--------	32	28	18	38
Square yards	29,400	--------	18,655	--------	19,140	17,640	7,200	18.876
Stake	--------	182	--------	2,655	1,142	590	20	110
Square yards	--------	4,540	--------	143,370	61,530	17,890	22,240	2,406
Lines, trot with baits or snoods	--------	52	--------	109	--------	--------	33	2
Baits or snoods	--------	28,200	--------	109,000	--------	--------	22,350	600
Pound nets	--------	97	--------	7	11	--------	39	--------
Fyke nets	236	5	--------	70	44	2	22	18
Pots, eel	--------	--------	6	--------	--------	--------	--------	--------
Dredges:								
Crab	--------	16	--------	--------	--------	--------	--------	--------
Yards at mouth	--------	30	--------	--------	--------	--------	--------	--------
Oyster	--------	2	--------	--------	--------	--------	--------	--------
Yards at mouth	--------	3	--------	--------	--------	--------	--------	--------
Tongs:								
Oyster	--------	179	--------	338	6	6	32	17
Other	--------	186	--------	--------	6	--------	--------	--------

Fisheries of Virginia, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Lancaster	Mathews	Middlesex	Nansemond	New Kent	Norfolk	Northampton	Northumberland
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	472	23	6	3	--------	30	--------	645
On boats and shore:								
Regular	458	375	492	47	2	118	447	919
Casual	868	381	873	141	65	106	219	796
Total	1,798	779	1,371	191	67	254	666	2,358
Vessels:								
Steam	8	--------	--------	--------	--------	--------	--------	18
Net tonnage	820	--------	--------	--------	--------	--------	--------	2,117
Motor	10	6	2	1	--------	5	--------	1
Net tonnage	397	87	21	6	--------	103	--------	117
Total vessels	18	6	2	1	--------	5	--------	19
Total net tonnage	1,217	87	21	6	--------	103	--------	2,234
Boats:								
Motor	578	268	611	76	3	50	256	381
Other	320	140	71	71	44	75	119	1,232
Accessory boats	39	--------	--------	--------	--------	--------	--------	57
Apparatus:								
Purse seines, menhaden	13	--------	--------	--------	--------	--------	--------	19
Length, yards	4,190	--------	--------	--------	--------	--------	--------	5,580
Haul seines	--------	4	6	--------	13	15	19	2
Length, yards	--------	1,500	2,750	--------	2,095	4,500	5,300	100
Gill nets:								
Drift	--------	--------	--------	--------	31	--------	--------	3
Square yards	--------	--------	--------	--------	24,800	--------	--------	2,880
Stake	--------	--------	--------	650	1	112	--------	--------
Square yards	--------	--------	--------	32,500	200	3,360	--------	--------
Lines, trot with baits or snoods	83	75	65	63	--------	79	164	221
Baits or snoods	44,690	72,050	52,000	44,100	--------	39,500	101,000	160,200
Trot with hooks	--------	--------	--------	--------	1	--------	--------	--------
Hooks	--------	--------	--------	--------	100	--------	--------	--------
Pound nets	198	402	14	--------	--------	20	155	378
Fyke nets	--------	--------	--------	10	16	--------	3	--------
Dip nets	650	--------	65	--------	--------	--------	100	1,310
Otter trawls	--------	1	--------	--------	--------	1	--------	--------
Yards at mouth	--------	30	--------	--------	--------	30	--------	--------
Dredges:								
Crab	--------	10	2	--------	--------	--------	21	--------
Yards at mouth	--------	20	4	--------	--------	--------	21	--------
Oyster	16	4	2	--------	--------	8	--------	--------
Yards at mouth	42	6	3	--------	--------	12	--------	--------
Tongs:								
Oyster	571	186	722	164	1	--------	1	245
Other	--------	12	--------	162	--------	47	32	--------
Picks	--------	--------	--------	--------	--------	--------	34	--------

Item	Prince George	Princess Anne	Prince William	Richmond	Stafford	Surry	Warwick	Westmoreland	York
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	--------	--------	--------	4	--------	145
On boats and shore:									
Regular	6	102	12	52	38	17	196	156	364
Casual	38	19	38	138	23	10	153	393	2
Total	44	121	50	190	61	27	353	549	511
Vessels:									
Motor	--------	--------	--------	--------	--------	--------	1	--------	46
Net tonnage	--------	--------	--------	--------	--------	--------	16	--------	402
Boats:									
Motor	8	16	13	37	16	16	164	84	183
Other	20	47	12	89	20	7	5	183	19
Apparatus:									
Haul seines	6	6	7	--------	9	4	--------	4	8
Length, yards	3,350	1,800	1,270	--------	1,550	1,000	--------	700	3,720
Gill nets:									
Drift	12	--------	6	13	1	2	--------	--------	3
Square yards	9,720	--------	12,680	5 200	4,100	2,000	--------	--------	1,200
Stake	50	--------	24	--------	96	260	263	2	--------
Square yards	200	--------	10,340	--------	39,460	23,400	7,890	1,125	--------

Fisheries of Virginia, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Prince George	Princess Anne	Prince William	Richmond	Stafford	Surry	Warwick	Westmoreland	York
Apparatus—Continued.									
Lines, trot with baits or snoods	*Number* --------	*Number* 33	*Number* --------	*Number* 10	*Number* 6	*Number* 2	*Number* 17	*Number* 150	*Number* 68
Baits or snoods	--------	8, 250	--------	2, 850	3, 040	1, 500	8, 500	106, 350	62, 500
Pound nets	--------	28	--------	25	--------	--------	22	56	25
Stop nets	2	--------	--------	--------	--------	--------	--------	--------	--------
Square yards	5, 310	--------	--------	--------	--------	--------	--------	--------	--------
Fyke nets	46	--------	143	1	42	15	3	11	--------
Dip nets	--------	--------	--------	--------	--------	--------	--------	80	--------
Otter trawls	--------	--------	--------	--------	--------	--------	1	--------	11
Yards at mouth	--------	--------	--------	--------	--------	--------	30	--------	326
Pots, eel	--------	--------	--------	--------	319	--------	--------	--------	--------
Dredges:									
Crab	--------	--------	--------	--------	--------	--------	--------	--------	90
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	--------	173
Oyster	--------	--------	--------	--------	--------	--------	--------	--------	4
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	--------	6
Tongs:									
Oyster	--------	15	--------	126	--------	--------	307	160	240
Other	--------	1	--------	--------	--------	--------	--------	--------	240

CATCH: BY COUNTIES

Species	Accomac		Arlington		Caroline		Charles City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	798, 400	$3, 489	--------	--------	--------	--------	3, 800	$38
Bluefish	22, 600	1, 136	--------	--------	--------	--------	--------	--------
Bonito	17, 400	620	--------	--------	--------	--------	--------	--------
Butterfish	853, 300	22, 163	--------	--------	--------	--------	--------	--------
Carp	--------	--------	--------	--------	--------	--------	19, 400	631
Catfish and bullheads	--------	--------	--------	--------	200	$8	30, 500	2, 086
Croaker	1, 690, 900	26, 974	--------	--------	--------	--------	--------	--------
Drum:								
Black	37, 500	750	--------	--------	--------	--------	--------	--------
Red or redfish	41, 200	752	--------	--------	--------	--------	--------	--------
Eels, common	25, 000	2, 500	--------	--------	200	10	1, 300	70
Flounders	78, 000	2, 557	--------	--------	--------	--------	--------	--------
Harvestfish	6, 400	256	--------	--------	--------	--------	--------	--------
Hickory shad	--------	--------	--------	--------	--------	--------	500	20
King whiting or "kingfish"	6, 500	275	--------	--------	--------	--------	--------	--------
Mackerel	800	40	--------	--------	--------	--------	--------	--------
Mullet	10, 000	677	--------	--------	--------	--------	100	2
Pigfish	1, 000	10	--------	--------	--------	--------	--------	--------
Pike or pickerel	--------	--------	--------	--------	--------	--------	100	10
Scup	22, 000	573	--------	--------	--------	--------	--------	--------
Shad	155, 400	10, 949	13, 200	$926	400	70	68, 600	7, 024
Spanish mackerel	9, 400	629	--------	--------	--------	--------	--------	--------
Spot	105, 100	2, 922	--------	--------	--------	--------	--------	--------
Squeteagues or "sea trout":								
Gray	1, 973, 500	51, 408	--------	--------	--------	--------	--------	--------
Spotted	1, 400	70	--------	--------	--------	--------	--------	--------
Striped bass	1, 500	130	--------	--------	200	35	3, 100	306
Sturgeon	1, 900	318	--------	--------	--------	--------	--------	--------
Thimble-eyed mackerel	12, 000	245	--------	--------	--------	--------	--------	--------
White perch	500	16	--------	--------	500	25	900	50
Whiting	3, 000	38	--------	--------	--------	--------	--------	--------
Yellow perch	--------	--------	--------	--------	100	3	100	5
Crabs:								
Hard	3, 064, 900	64, 572	--------	--------	--------	--------	--------	--------
Soft	582, 700	31, 177	--------	--------	--------	--------	--------	--------
Clams, hard, public	1, 458, 800	125, 740	--------	--------	--------	--------	--------	--------
Mussels	23, 400	540	--------	--------	--------	--------	--------	--------
Oysters:								
Market, public, spring	603, 300	31, 533	--------	--------	--------	--------	--------	--------
Market, public, fall	713, 700	37, 222	--------	--------	--------	--------	--------	--------
Market, private, spring	1, 240, 400	92, 740	--------	--------	--------	--------	--------	--------
Market, private, fall	1, 120, 500	87, 750	--------	--------	--------	--------	--------	--------
Squid	32, 300	1, 385	--------	--------	--------	--------	--------	--------
Terrapin, diamond back	200	90	--------	--------	--------	--------	--------	--------
Total	14, 714, 900	602, 246	13, 200	926	1, 600	151	128, 400	10, 242

Fisheries of Virginia, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3,300	$56	44,900	$662	110,000	$1,373	6,000	$140
Bluefish					136,800	6,179		
Butterfish					180,200	8,708		
Cabio or crab eater					3,500	175		
Carp	3,000	148	4,600	193			2,600	99
Catfish and bullheads	2,300	81	5,800	194	6,200	310	5,100	194
Cod					200	6		
Croaker					5,374,300	88,787	13,000	350
Drum, red or redfish					6,300	118		
Eels:								
Common					200	16	400	16
Conger					1,900	37		
Flounders					382,400	21,049		
Gizzard shad					2,700	52	11,000	190
Haddock					500	4		
Hake					16,400	211		
Harvestfish					135,500	6,775		
Hickory shad	500	25	700	16	16,900	785	100	4
King whiting or "kingfish"					22,900	822		
Minnows			49,600	1,238				
Mullet	200	8			23,600	369		
Pigfish					200	5		
Scup					421,400	11,485		
Sea bass					81,000	2,801		
Sea robin					500	17		
Shad	4,000	381	3,000	250	281,000	27,800	2,700	555
Sharks					9,400	244		
Skates					9,300	76		
Spanish mackerel					18,800	1,504		
Spot					302,500	13,369	1,500	60
Squeteagues or "sea trout", gray					3,044,400	77,133		
Striped bass					27,000	2,180	900	85
Sturgeon					5,100	654		
Suckers			300	11				
White perch	200	10			31,200	609	4,800	306
Whiting					900	15		
Yellow perch					4,500	280	1,500	80
Crabs, hard					1,728,400	40,081	9,600	160
Lobsters					100	12		
Clams, hard, public					8,400	1,575		
Oysters:								
Market, public, spring					75,600	3,780	187,300	12,425
Market, public, fall					75,600	3,780	187,200	12,425
Market, private, spring					305,200	26,814	45,000	4,200
Market, private, fall					734,000	64,484	45,000	4,200
Scallops, sea					1,300	896		
Squid					4,200	110		
Terrapin, diamond back					22,500	750		
Total	13,500	709	108,900	2,564	13,613,100	416,230	523,700	35,489

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			18,000	$89	5,800	$53	38,000	$205
Bluefish			96,000	3,840				
Butterfish			271,500	5,430			3,700	118
Cabio or crab eater			800	48				
Carp	7,900	$316	300	15	5,100	255	7,800	242
Catfish and bullheads	93,900	3,756	700	22	4,200	184	11,000	225
Croaker			1,340,500	16,749			54,100	1,069
Eels, common			700	49	400	40	1,400	84
Flounders			17,000	675			6,300	242
Gizzard shad	300	3					5,400	27
Harvestfish			41,800	2,090				
King whiting or "kingfish"			20,300	406				
Menhaden			69,000	230				
Minnows					200	135		
Mullet			700	21			27,400	736
Shad	51,100	3,575	158,100	16,090	13,500	2,160	79,700	12,953
Spanish mackerel			1,500	150				
Spot			36,000	1,082				
Squeteagues or "sea trout":								
Gray			1,336,300	20,062			9,600	480
Spotted			1,000	60				
Striped bass	6,000	600	500	40			7,300	864

Fisheries of Virginia, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
White perch	51, 100	$1, 536					35, 000	$1, 400
Yellow perch	15, 400	1, 506						
Crabs, hard			2, 342, 000	$47, 102			784, 800	11, 445
Clams, hard, public			212, 600	31, 432				
Oysters:								
Market, public, spring			441, 200	29, 412			245, 000	13, 700
Market, public, fall			408, 400	27, 224			254, 000	15, 210
Market, private, spring			30, 000	2, 500			3, 000	180
Market, private, fall			30, 000	2, 500			5, 000	300
Total	225, 700	11, 292	6, 874, 900	207, 318	29, 200	$2, 827	1, 578, 500	59, 480

Species	James City		King and Queen		King George		King William	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	18, 700	$266	800	$16	26, 700	$287	25, 100	$253
Butterfish					4, 300	93		
Carp	41, 300	1, 901	200	8	4, 500	102	500	20
Catfish and bullheads	13, 800	407	1, 200	36	170, 100	8, 335	1, 100	30
Croaker	10, 500	246	200	3	200	2	500	5
Eels, common					8, 800	352		
Flounders	1, 100	55						
Gizzard shad					9, 200	162		
Hickory shad			1, 000	30	100	5	300	3
Mullet			1, 500	51			700	11
Pike or pickerel					400	35		
Shad	57, 500	6, 900	14, 100	1, 745	38, 100	3, 500	9, 200	1, 076
Squeteagues or "sea trout", gray	2, 700	162			99, 000	2, 970		
Striped bass	14, 300	1, 494	700	72	56, 100	5, 642	700	88
White perch	8, 700	348	700	28	60, 000	3, 028	300	12
Yellow perch					3, 100	103		
Crabs, hard					457, 500	10, 813	10, 000	200
Clams, hard, public	7, 200	1, 350						
Oysters:								
Market, public, spring	7, 300	291	21, 600	360	44, 200	1, 657	3, 600	60
Market, public, fall	14, 600	782			56, 800	2, 129		
Market, private, spring							99, 600	1, 660
Market, private, fall							99, 600	1, 660
Terrapin, diamond back	500	30						
Turtles, snapper	1, 400	29						
Total	199, 600	14, 261	42, 000	2, 349	1, 039, 100	39, 215	251, 200	5, 078

Species	Lancaster		Mathews		Middlesex		Nansemond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	134, 300	$1, 343	543, 400	$2, 971	7, 000	$60	5, 000	$50
Bluefish	900	36	483, 500	21, 684	12, 000	730		
Butterfish	6, 200	186	671, 400	23, 474				
Cabio or crab eater			21, 000	840				
Carp					4, 000	120		
Catfish and bullheads					200	10		
Croaker	745, 000	14, 900	4, 836, 000	25, 980	190, 000	2, 870	12, 000	358
Eels, common							500	30
Flounders	900	51	120, 300	3, 811			10, 000	500
Hake			3, 700	55				
Harvestfish			10, 500	263				
Hickory shad	600	18	15, 200	312				
King whiting or "king-fish"			400	21				
Menhaden	54, 808, 600	241, 261	120, 000	300				
Pigfish			6, 300	126				
Scup			87, 200	2, 401				
Sea bass			17, 500	684				
Shad	44, 900	4, 490	2, 064, 700	118, 930	2, 000	160	8, 800	1, 316
Spanish mackerel			400	40				
Spot	15, 300	459	597, 000	13, 435	155, 500	2, 550		
Squeteagues or "sea trout":								
Gray	46, 100	1, 383	2, 559, 300	39, 629	38, 500	1, 230	700	52
Spotted			5, 100	255				
Striped bass	6, 000	1, 075	22, 600	855	13, 000	1, 030	1, 000	100
White perch			4, 400	132			2, 500	50

Fisheries of Virginia, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Lancaster		Mathews		Middlesex		Nansemond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Whiting			300	$6				
Yellow perch							5,000	$250
Crabs:								
Hard	968,500	$32,450	1,157,500	20,270	706,800	$9,680	544,000	9,072
Soft	196,700	18,200			77,700	7,800		
Clams, hard, public			8,600	1,620			47,000	11,740
Oysters:								
Market, public, spring	984,800	65,651	111,600	7,001	954,500	63,946	37,800	2,205
Market, public, fall	1,094,000	69,289	237,500	14,054	954,500	63,946	289,800	16,905
Market, private, spring	1,626,000	108,520	92,700	6,448	382,000	27,800	27,000	1,575
Market, private, fall	595,600	39,023	136,000	9,083	364,000	26,000	81,000	4,725
Total	61,274,400	598,335	13,934,100	314,680	3,861,700	207,932	1,072,100	48,928

Species	New Kent		Norfolk		Northampton		Northumberland	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	74,000	$1,068	80,500	$402			2,858,500	$18,550
Bluefish			10,000	500	28,100	$1,863	59,900	2,392
Bonito					2,200	111		
Butterfish			300,200	9,006	824,300	25,076	17,300	519
Carp	11,000	440						
Catfish and bullheads	11,800	331						
Cod					1,000	10		
Croaker	34,500	345	1,420,000	10,669	611,600	6,904	477,700	6,913
Cutlassfish					1,900	5		
Drum, red or redfish			800	16			1,900	38
Eels, common	100	3			41,000	6,850		
Flounders			50,100	2,004	31,600	1,496	4,500	147
Gizzard shad	30,100	166					600	3
Harvestfish			28,600	715				
Herring, sea					361,400	2,638		
Hickory shad	200	2					14,900	183
King whiting or "kingfish"			2,500	125	5,400	270		
Mackerel					14,100	1,130		
Menhaden							88,881,200	358,622
Minnows	6,800	1,708						
Mullet			6,300	126	12,000	690		
Scup					10,500	209		
Sea bass					1,500	77		
Sea robin			100	1				
Shad	15,000	1,817	154,400	15,440	6,600	518	451,700	40,649
Sharks			4,300	63				
Spanish mackerel			17,800	1,424	2,500	204		
Spot			296,400	11,158	21,300	593	7,100	186
Squeteagues or "sea trout":								
Gray	9,000	270	391,700	5,966	2,267,800	21,605	217,200	3,795
Spotted			9,000	450			5,000	76
Striped bass	800	64	2,100	168	600	120	37,800	2,978
Thimble-eyed mackerel					10,000	100		
White perch	5,100	287					300	3
Yellow perch	500	39						
Crabs:								
Hard			995,400	16,590	1,710,000	40,000	2,936,800	29,368
Soft					143,100	8,100	352,200	29,205
Clams, hard, public			56,400	1,763	499,500	139,870		
Oysters:								
Market, public, spring	1,300	108					188,800	9,088
Market, public, fall	1,300	108					273,400	12,613
Market, private, spring			1,062,500	64,099	56,100	3,296	217,700	11,133
Market, private, fall			2,129,000	128,527	56,100	3,297	386,900	18,183
Squid			800	19	52,400	1,573		
Turtles, snapper	2,000	80						
Total	203,500	6,836	7,018,900	269,231	6,772,600	266,605	97,391,400	544,644

Fisheries of Virginia, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Prince George		Princess Anne		Prince William		Richmond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6, 900	$97	104, 000	$710	8, 200	$41	41, 800	$850
Bluefish			14, 000	1, 400				
Butterfish			168, 000	6, 720			29, 000	580
Carp	28, 700	1, 033	12, 000	600	17, 500	875	38, 200	1, 146
Catfish and bullheads	43, 000	943	2, 800	84	39, 900	1, 673	34, 200	684
Croaker			1, 680, 000	15, 550			16, 000	480
Drum, red or redfish			1, 000	20				
Eels, common	1, 200	58	3, 000	90			700	36
Flounders			70, 000	2, 800				
Gizzard shad					14, 000	140	22, 000	440
Harvestfish			40, 000	1, 000				
Hickory shad							2, 800	112
King whiting or "kingfish"			25, 000	2, 000				
Mullet	600	36			1, 400	56		
Pike or pickerel	200	12			1, 400	140		
Shad	16, 300	1, 498	177, 100	17, 710	31, 700	2, 203	12, 400	2, 480
Spanish mackerel			1, 800	180				
Spot			143, 600	5, 766			1, 000	60
Squeteagues or "sea trout":								
Gray			606, 000	9, 750				
Spotted			3, 600	180				
Striped bass	900	76			27, 200	3, 086	7, 800	780
Suckers			12, 000	300				
Sunfish			24, 000	600				
White perch	1, 200	57	10, 200	204	21, 000	1, 050	18, 500	848
Yellow perch	800	36			6, 300	315	200	5
Crabs, hard			416, 800	6, 930			85, 800	1, 430
Clams, hard, public			800	200				
Oysters:								
Market, public, spring							151, 200	12, 930
Market, public, fall							151, 200	12, 930
Market, private, spring			28, 000	1, 600			115, 500	8, 250
Market, private, fall			56, 000	3, 200			115, 500	8, 250
Total	99, 800	3, 846	3, 599, 700	77, 594	168, 600	9, 579	843, 800	52, 291

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			8, 400	$126	800	$8	840, 000	$5, 600	33, 900	$170
Bluefish									72, 700	2, 215
Butterfish					4, 000	111			5, 900	259
Carp	7, 300	$418	28, 900	1, 726			6, 800	407		
Catfish and bullheads	11, 000	690	6, 500	195			14, 300	461		
Cod					100	7			200	2
Croaker					434, 500	5, 334	26, 300	395	975, 000	8, 787
Drum, red or redfish					500	5			1, 100	17
Eels:										
Common	28, 600	1, 716	1, 000	80			1, 100	54		
Conger					100	1			100	1
Flounders					41, 900	2, 373			156, 500	9, 284
Gizzard shad							100	1		
Hake					1, 200	15			100	3
Hickory shad					600	6	40, 200	402		
King whiting or "kingfish"					2, 200	65			16, 400	674
Mackerel									100	4
Mullet									500	40
Pigfish					300	4			1, 100	14
Pike or pickerel	2, 000	200					100	10		
Scup					108, 500	3, 427			42, 800	936
Sea bass					26, 500	1, 334			500	23
Shad	54, 500	3, 818	6, 100	948	61, 600	2, 904	28, 500	2, 275	18, 500	1, 850
Sharks					2, 400	58			4, 100	118
Skates					800	4				
Spot					3, 900	114			355, 000	6, 953
Squeteagues or "sea trout":										
Gray					39, 000	703	392, 500	11, 775	372, 500	4, 987
Spotted									24, 000	1, 440
Striped bass	3, 600	396	3, 800	304	3, 600	272	60, 700	6, 221		
Sturgeon					1, 100	88			200	19
Suckers	1, 000	20								
Swellfish					100	6			1, 600	53
Tautog					100	1			400	6

Fisheries of Virginia, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
White perch	12,500	$750	1,500	$60	6,100	$164	37,600	$1,688	600	$9
Whiting	--------	--------	--------	--------	--------	--------	--------	--------	300	9
Yellow perch	12,600	804	--------	--------	--------	--------	600	18	--------	--------
Crabs:										
Hard	14,900	576	600	8	72,700	914	606,600	9,288	3,902,400	113,095
Soft	--------	--------	--------	--------	--------	--------	17,900	1,500	--------	--------
Clams, hard, public	--------	--------	--------	--------	--------	--------	--------	--------	309,800	49,080
Oysters:										
Market, public, spring	--------	--------	--------	--------	96,000	3,520	60,200	3,611	568,000	30,364
Market, public, fall	--------	--------	--------	--------	192,000	7,040	6,000	352	307,500	16,554
Market, private, spring	--------	--------	--------	--------	12,600	462	1,500	88	146,000	8,600
Market, private, fall	--------	--------	--------	--------	25,200	924	240,700	14,442	157,000	9,100
Squid	--------	--------	--------	--------	1,600	45	--------	--------	1,500	47
Total	148,000	9,388	56,800	3,447	1,140,000	29,909	2,381,700	58,588	7,476,300	264,713

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	16		8		24	
On boats and shore:						
Regular	--------		1,005		1,005	
Casual	--------		120		120	
Total	16		1,133		1,149	
Vessels:						
Motor	4		3		7	
Net tonnage	48		21		69	
Boats:						
Motor	--------		558		558	
Other	--------		36		36	
Apparatus:						
Number	8		1,131		--------	
Yards at mouth	16		--------		--------	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	--------	--------	1,153,083	$173,664	1,153,083	$173,664
Seed, public, fall	--------	--------	864,342	130,348	864,342	130,348
Seed, private, spring	32,868	$1,643	--------	--------	32,868	1,643
Seed, private, fall	32,868	1,644	--------	--------	32,868	1,644
Total	65,736	3,287	2,017,425	304,012	2,083,161	307,299

Fisheries of Virginia, 1934—Continued

SEED OYSTER FISHERY: BY COUNTIES

Item	Accomac		Elizabeth City		Gloucester		Isle of Wight	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels	--------		16		--------		3	
On boats and shore:								
Regular	77		14		124		336	
Total	77		30		124		339	
Vessels:								
Motor	--------		4		--------		1	
Net tonnage	--------		48		--------		5	
Boats:								
Motor	25		10		85		163	
Other	--------		--------		--------		30	
Apparatus:								
Tongs	77		14		124		338	
Dredges	--------		8		--------		--------	
Yards at mouth	--------		16		--------		--------	
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	5,400	$1,508	33,600	$5,040	213,750	$32,064	506,500	$75,975
Seed, public, fall	5,400	1,507	25,200	3,780	122,250	18,336	505,500	75,825
Seed, private, spring	--------	--------	32,868	1,643	--------	--------	--------	--------
Seed, private, fall	--------	--------	32,868	1,644	--------	--------	--------	--------
Total	10,800	3,015	124,536	12,107	336,000	50,400	1,012,000	151,800

Item	James City		Mathews		Nansemond		Norfolk	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels	--------		--------		3		--------	
On boats and shore:								
Regular	6		47		--------		30	
Casual	--------		--------		--------		16	
Total	6		47		3		46	
Vessels:								
Motor	--------		--------		1		--------	
Net tonnage	--------		--------		6		--------	
Boats:								
Motor	2		24		--------		10	
Other	--------		--------		--------		6	
Apparatus, tongs	6		47		2		46	
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public spring	5,550	$834	59,533	$8,930	1,250	$188	15,000	$2,250
Seed, public, fall	2,775	416	29,767	4,467	1,250	187	15,000	2,250
Total	8,325	1,250	89,300	13,397	2,500	375	30,000	4,500

Item	Surry		Warwick		York	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	2		--------		--------	
On boats and shore:						
Regular	--------		131		240	
Casual	4		100		--------	
Total	6		231		240	
Vessels:						
Motor	1		--------		--------	
Net tonnage	10		--------		--------	
Boats, motor	2		115		122	
Apparatus, tongs	6		231		240	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	6,000	$900	84,500	$12,675	222,000	$33,300
Seed, public, fall	4,000	600	42,200	6,330	111,000	16,650
Total	10,000	1,500	126,700	19,005	333,000	49,950

NOTE.—Of the total number of persons fishing for seed oysters, 1,005 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 6 vessels, 461 motorboats, 36 other boats, 8 dredges, and 987 tongs.

SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The catch of shad in the Potomac River in 1934 amounted to 152,876 in number, 567,100 pounds in weight, and their total value to the fishermen was $47,504. The catch of alewives for the same season amounted to 5,070,840 in number, with a total weight of 2,028,400 pounds, and a value to the fishermen of $16,256. These figures show a decrease of 69 percent in the weight and 68 percent in the value of shad as compared with 1933, and a decrease of 71 percent in weight and 32 percent in the value of alewives.

Approximately 64 percent of the shad, in weight, were taken with pound nets, and 36 percent, with gill nets. More than 99½ percent of the alewives were taken with pound nets, only a small quantity being taken with gill nets.

Statistics of the catch of shad and alewives in Potomac River are also included in the catch data for Maryland and Virginia which are published elsewhere in this report.

Shad and alewife fisheries of the Potomac River, 1934

Item	Maryland			Virginia			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Fishermen on boats and shore:									
Regular	34			296			330		
Casual	113			121			234		
Total	147			417			564		
Boats:									
Motor	46			145			191		
Other	45			93			138		
Apparatus:									
Pound nets	46			279			325		
Gill nets	1, 045			774			1, 819		
Square yards	196, 615			182, 030			378, 645		
Shad caught:									
With pound nets	3, 065	10, 400	$1, 058	94, 034	352, 000	$31, 331	97, 099	362, 400	$32, 389
With gill nets	6, 975	25, 300	2, 570	48, 802	179, 400	12, 545	55, 777	204, 700	15, 115
Total	10, 040	35, 700	3, 628	142, 836	531, 400	43, 876	152, 876	567, 100	47, 504
Alewives caught:									
With pound nets	52, 000	20, 800	470	4, 995, 400	1, 998, 200	15, 734	5, 047, 400	2, 019, 000	16, 204
With gill nets				23, 440	9, 400	52	23, 440	9, 400	52
Total	52, 000	20, 800	470	5, 018, 840	2, 007, 600	15, 786	5, 070, 840	2, 028, 400	16, 256

TRADE IN FISHERY PRODUCTS IN WASHINGTON, D. C.[9]

The municipal fish wharf and market in Washington, D. C., is located in the southwestern part of the city on an arm of the Potomac River. At the present time 17 firms have stalls in this market, 4 have stalls in the new Center Market, located at Fifth and K Streets NW., and 4 are scattered in other parts of the city. Altogether there are 25 firms which employ 132 persons who received $137,185 in salaries and wages during 1934. Of the total employees 100 were regularly employed. These firms conduct mainly a wholesale business although some retail trade is carried on.

The facilities for handling fish and oysters from boats and vessels that may land at the wharf are good, but only a comparatively small quantity are brought into the city by this method. In the fall and winter, considerable quantities of shell oysters are landed, but most of the oysters handled in Washington are brought in already shucked from Maryland and Virginia, by trucks and other transportation facilities.

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[9] Trade of fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department, District of Columbia.

During the year 1934 the receipts of fresh and frozen fishery products as received at the municipal fish wharf amounted to 9,933,552 pounds. This is an increase of 4 percent as compared with 1933 and an increase of 1 percent as compared with the 5-year average.

During 1934 three firms in Washington, D. C., smoked fishery products, amounting to 187,100 pounds, valued at $20,205. Of this amount, 153,500 pounds, valued at $11,160, consisted of herring smoked as bloaters; 29,500 pounds, valued at $8,310, were whitefish; while the remainder or 4,100 pounds, valued at $735, consisted of alewives or "river herring", eels, and haddock.

Fishery products received at municipal fish wharf and market, Washington, D. C., 1934

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Alewives (river herring)	8, 000	6, 300	56, 050	239, 500	209, 950	10, 200							530, 000
Bluefish	4, 600	1, 000	3, 600	14, 200	32, 500	8, 300	6, 800	13, 400	46, 400	77, 600	24, 700	4, 200	237, 300
Butterfish	3, 800	16, 000	2, 900	7, 200	37, 400	74, 300	69, 900	58, 400	26, 200	18, 000	22, 000	6, 900	343, 000
Carp	5, 700	2, 300	8, 500	28, 600	11, 900	5, 600	1, 200	6, 500	14, 700	11, 000	6, 400	7, 600	110, 000
Catfish	2, 000	200	12, 300	36, 900	10, 400	10, 400	1, 400	2, 900	7, 580	12, 300	16, 100	5, 000	117, 480
Cod	1, 000	800	1, 200	3, 200	3, 000	1, 000	200	500	200	100	900	1, 700	13, 800
Croaker	117, 300	52, 200	44, 500	238, 800	436, 000	283, 900	201, 600	337, 200	152, 400	182, 800	171, 100	227, 600	2, 445, 400
Drum, red or redfish	1, 100	4, 400	1, 900	700	3, 100	1, 700			1, 600	2, 000	4, 200	9, 500	30, 200
Eels	300	100	100	1, 500	200			100	1, 100	2, 700	850	200	7, 150
Flounders	36, 000	35, 700	30, 800	23, 100	34, 500	15, 900	22, 400	19, 965	13, 170	26, 110	33, 755	2, 300	314, 700
Gizzard shad	14, 300	2, 400	38, 600	10, 400	800						7, 150	2, 200	75, 850
Haddock	27, 405	22, 185	55, 170	42, 680	36, 825	16, 125	17, 520	22, 650	19, 000	22, 110	18, 640	25, 460	325, 770
Hake	600			800									1, 400
Halibut	5, 200	3, 300	10, 400	12, 200	5, 000	4, 000	3, 600	5, 000	5, 000	6, 000	7, 603	2, 200	69, 503
Hickory shad or "jacks"	2, 300	900	1, 500	1, 100									5, 800
Hogfish									200				200
Kingfish or "king mackerel"	300		1, 000	2, 400	2, 200				600	500	1, 200	600	8, 800
Mackerel	26, 100	13, 900	25, 100	17, 600	21, 600	16, 600	15, 200	14, 600	19, 400	13, 200	10, 200	19, 100	212, 600
Mullet	2, 600	400	1, 200						1, 800	12, 600	7, 200	13, 200	39, 000
Perch	6, 900	1, 900	29, 800	43, 300	8, 800	5, 200	400	700	4, 600	7, 800	10, 500	6, 600	126, 500
Pike or pickerel	100		1, 300	400		100	400		300	800	400	200	4, 000
Pollock	400	200	3, 000		100						300		4, 000
Pompano					100						100		200
Salmon	4, 400	2, 900	9, 501	5, 200	1, 000	1, 600	3, 600	7, 600	7, 200	11, 500	8, 300	2, 400	65, 201
Scup or porgy	13, 400	28, 600	43, 700	25, 400	600	5, 700	3, 300	1, 800				700	123, 200
Sea bass	63, 000	50, 700	82, 500	68, 600	16, 800	12, 600	35, 300	15, 600	1, 800	800	11, 800	2, 900	362, 400
Shad	16, 100	12, 200	64, 100	137, 500	119, 250	5, 400							354, 550
Sheepshead										300			300
Skates				400									400
Smelt	810	1, 245	1, 520	1, 645						1, 125		1, 000	7, 345
Snapper, red	300	400	200	830	1, 075	40			50	200	200	1, 100	4, 395
Spot		2, 200	3, 200		1, 800	9, 800	11, 100	22, 800	68, 200	136, 200	40, 100	300	295, 700
Squeteagues or "sea trout"	87, 200	62, 100	62, 800	45, 000	193, 500	189, 200	193, 100	257, 200	246, 200	266, 500	206, 300	113, 300	1, 922, 400
Striped bass	2, 400	4, 800	12, 300	38, 700	15, 300	10, 900	2, 400	1, 700	8, 040	17, 050	14, 600	5, 700	133, 890
Sturgeon	50	230			690	83				150		653	1, 856
Swordfish	275	225	1, 306	810	468	150	643	590	550	575	600	100	6, 292
Tilefish	600	100	300	400	300		100		50		200	100	2, 150
Tuna						1, 700	800						2, 500
Whitefish			200			300	400		750	200			1, 850
Whiting			200		2, 000						200	3, 200	5, 600
Yellowtail						200						400	600

Crabs:													
Hard				400	3, 300	25, 700	58, 500	105, 900	44, 100	14, 600			252, 500
Soft				9, 225	6, 570	18, 630	14, 715	16, 650	7, 110	3, 015	540		76, 455
Meat	3, 485	2, 700	2, 710	2, 580	18, 265	15, 445	28, 065	41, 350	22, 200	8, 680	3, 490	3, 000	151, 970
Sea crawfish or "spiny lobster":													
Alive	25	100	300	150		50	25			25	25	25	725
Meat	25	30	135	300	75	75	10			5	135	125	915
Lobsters:													
Alive	578	275	150	300	850	1, 075	120	1, 850	775	1, 500	900	650	9, 023
Meat	100	60	75	125	75	35	10	400				25	905
Shrimp	6, 932	17, 325	10, 680	10, 738	19, 150	19, 700	19, 000	12, 500	10, 750	12, 385	10, 025	9, 860	159, 045
Squid	200	400	400		200	300	200			400		500	2, 600
Clams:													
Hard	4, 896	3, 968	5, 216	3, 424	7, 584	5, 664	5, 760	6, 432	8, 704	6, 496	4, 928	3, 840	[1] 66, 912
Soft										18			18
Oysters:													
Meats in the shell	25, 585	10, 451	11, 599	9, 597	546				24, 500	68, 733	66, 241	31, 311	[2] 248, 563
Fresh shucked	69, 548	54, 898	87, 106	26, 705	1, 461				62, 038	141, 601	97, 230	80, 605	[3] 621, 192
Scallops	1, 712	1, 008	1, 680	2, 704	5, 072	2, 400	3, 520	792	800	3, 680	1, 560	1, 176	[4] 26, 104
Frogs				95	264	88	15	9		19		80	570
Terrapin	38		100										138
Turtles:													
Sea					990	1, 125							2, 115
Soft					20								20
Other					40					460			500
Total	567, 664	421, 100	730, 898	1, 115, 408	1, 271, 620	781, 285	721, 303	975, 088	828, 067	1, 091, 837	810, 672	618, 610	9, 933, 552

[1] 8,364 bushels.
[2] 35,509 bushels.
[3] 70,993 gallons.
[4] 4,351 bushels.

NOTE.—The hard clams have been converted to pounds on the basis of 8 pounds of meats to the bushel, the oysters on the basis of 7 pounds of meats to the bushel, and 8¾ pounds to the gallon, and the scallops on the basis of 6 pounds of meats to the bushel.

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

(South Atlantic, Area XXIV; Gulf, Area XXV)[10]

The yield of the commercial fisheries of the marine areas of the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) during 1934 amounted to 447,913,900 pounds, valued at $9,993,660, to the fishermen, representing an increase of 49 percent in volume and 55 percent in value as compared with the catch in 1932, the most recent year for which catch statistics are available. These fisheries gave employment to 24,898 fishermen as compared with 21,560 in 1932.

There were 591 fishery wholesale and manufacturing establishments in these States in 1934, as compared with 585 in 1931, when the most recent previous survey of these establishments was made. In 1934, these establishments employed 14,354 persons, paid $2,873,812 in salaries and wages and produced manufactured products (canned, cured, packaged, and byproducts), valued at $9,906,595. In 1931, the wholesale and manufacturing firms employed 13,635 persons, paid $2,821,543 in salaries and wages and produced manufactured products valued at $8,374,588.

Fisheries of the South Atlantic and Gulf States, 1934

SUMMARY OF CATCH

Product	North Carolina		South Carolina		Georgia	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	154, 567, 900	$1, 395, 596	1, 168, 400	$63, 063	19, 233, 900	$116, 490
Shellfish, etc	8, 894, 000	276, 629	4, 722, 800	162, 228	7, 907, 000	243, 020
Total	163, 461, 900	1, 672, 225	5, 891, 200	225, 291	27, 140, 900	359, 510

Product	Florida		Alabama		Mississippi	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	97, 899, 100	$2, 117, 934	2, 755, 200	$110, 046	1, 312, 400	$42, 155
Shellfish, etc	20, 901, 600	1, 516, 788	5, 208, 800	143, 360	20, 840, 600	610, 146
Total	118, 800, 700	3, 634, 722	7, 964, 000	253, 406	22, 153, 000	652, 301

Product	Louisiana		Texas		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	3, 138, 000	$178, 297	7, 940, 500	$410, 680	288, 015, 400	$4, 434, 261
Shellfish, etc	73, 495, 200	2, 106, 266	17, 928, 500	500, 962	159, 898, 500	5, 559, 399
Total	76, 633, 200	2, 284, 563	25, 869, 000	911, 642	447, 913, 900	9, 993, 660

OPERATING UNITS: BY STATES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	723	20	139	870	122	557	369	114	2, 914
On boats and shore:									
Regular	2, 620	596	381	5, 461	436	917	4, 529	1, 068	16, 008
Casual	2, 012	877	468	1, 177	125	232	626	459	5, 976
Total	5, 355	1, 493	988	7, 508	683	1, 706	5, 524	1, 641	24, 898

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[10] These are the numbers given to these areas by the North American Council on Fishery Investigations. The catch in the Mississippi River and tributaries is not included in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter p art of this document entitled "Statistical survey procedure."

Fisheries of the South Atlantic and Gulf States, 1934—Continued

OPERATING UNITS: BY STATES—Continued

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Vessels:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	93	5	46	202	34	144	151	35	710
Net tonnage	1, 340	67	421	3, 316	339	1, 905	1, 056	345	8, 789
Sail	30								30
Net tonnage	298								298
Total vessels	123	5	46	202	34	144	151	35	740
Total net tonnage	1, 638	67	421	3, 316	339	1, 905	1, 056	345	9, 087
Boats:									
Motor	1, 344	94	122	2, 064	184	341	1 698	462	6, 309
Other	1, 829	762	423	2, 966	160	361	1, 243	345	8, 089
Accessory boats	112		6	18			62		198
Apparatus:									
Purse seines:									
Menhaden	31		2	5					38
Length, yards	7, 940		600	1, 475					10, 015
Other	1			1					2
Length, yards	175			350					525
Haul seines:									
Common	412	27	8	116	8	1	95	23	690
Length, yards	53, 160	3, 880	800	39, 455	4, 350	300	21, 404	2, 500	125, 849
Long	87			75					162
Length, yards	86, 475			50, 300					136, 775
Gill nets:									
Anchor	1, 840	190	47	26					2, 103
Square yards	1, 128, 700	129, 296	11, 375	38, 600					1, 307, 971
Drift	220	285	165	105					775
Square yards	469, 170	217, 120	103, 540	185, 790					975, 620
Runaround	159	16	12	2, 259				84	2, 530
Square yards	66, 730	4, 050	3, 570	1, 820, 749				18, 344	1, 913, 443
Stake	4, 931		5	6	16			215	5, 173
Square yards	388, 205		1, 800	2, 340	2, 450			53, 662	448, 457
Trammel nets				181	57	27	75	85	425
Square yards				129, 839	18, 745	7, 370	13, 599	40, 240	209, 793
Lines:									
Hand	81	175	39	1, 549	126	159	242	356	2, 727
Hooks	172	495	39	2, 155	204	178	253	356	3, 852
Troll	45			1, 029				17	1, 091
Hooks	45			1, 137				17	1, 199
Trot with baits or snoods	423	6	32	30	38	99	380	36	1, 044
Baits or snoods	342, 800	4, 500	10, 080	6, 740	7, 640	19, 260	83, 035	13, 200	487, 255
Trot with hooks	50		40	106	112		4	68	380
Hooks	6, 200		2, 840	42, 360	11, 550		1, 800	52, 150	116, 900
Pound nets	1, 522			17					1, 539
Weirs	12								12
Wheels	33								33
Stop nets				9					9
Square yards				15, 670					15, 670
Fyke nets	480				10				490
Dip nets:									
Common	480			57			159	6	702
Drop				24		120	13, 369		13, 513
Cast nets			10	18		64	178	1	271
Otter trawls:									
Fish				2					2
Yards at mouth				63					63
Shrimp	130	50	149	264	160	366	1, 611	319	3, 049
Yards at mouth	2, 634	1, 009	3, 248	5, 324	2, 067	4, 658	19, 354	5, 066	43, 360
Brush traps							25, 250		25, 250
Pots:									
Crab			48	1, 648					1, 696
Eel	750			40					790
Fish	730		50	3, 020	78				3, 878
Sea crawfish				958					958
Spears	65	20		31	60	72		105	353
Dredges:									
Clam				1					1
Oyster	143		3	4	9	398	57	48	662
Yards at mouth	147		3	4	9	398	58	53	672
Scallops				6					6
Yards at mouth				11					11
Tongs, oyster	249	11	90	391	106	224	758	196	2, 025
Rakes, other than for oysters	431	2		2					435
Forks				52					52
Grabs		317	20	28					365
Coquina scoops				1					1
Hooks, sponge				241					241
Diving outfits				53					53

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES

Species	North Carolina		South Carolina		Georgia	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	14, 897, 000	$90, 901				
Black bass	1, 500	75				
Bluefish	1, 766, 500	63, 515	3, 000	$180		
Bowfin	600	6				
Butterfish	43, 500	745				
Carp	108, 600	4, 316				
Catfish and bullheads	162, 600	3, 173			52, 500	$3, 150
Cero	4, 400	220				
Croaker	7, 682, 800	91, 058			7, 000	280
Drum, red or redfish	132, 500	2, 750	3, 500	105	2, 500	125
Eels	44, 300	2, 043				
Flounders	987, 500	42, 150	31, 500	1, 775	3, 300	96
Gizzard shad	24, 000	230				
Grunts			9, 100	273		
Harvestfish or "starfish"	820, 000	12, 325				
Hickory shad	99, 700	4, 634	4, 500	450	10, 500	1, 042
King whiting or "kingfish"	302, 000	7, 240	14, 000	420	12, 000	380
Menhaden	106, 651, 100	355, 503			18, 751, 500	63, 859
Mullet	3, 889, 300	105, 289	700, 000	19, 000	59, 000	2, 600
Pigfish	92, 000	1, 130				
Pike or pickerel	1, 200	66				
Pinfish or sailors choice	180, 000	900				
Pompano	400	60				
Sea bass	75, 400	3, 045	106, 200	4, 560	23, 000	690
Shad	1, 274, 000	193, 187	208, 600	31, 290	232, 000	38, 400
Sharks			12, 000	120		
Sheepshead	3, 700	80				
Spadefish	6, 000	150				
Spanish mackerel	47, 700	2, 358				
Spot	4, 788, 000	73, 035	10, 500	315	13, 000	460
Squeteagues or "sea trout":						
Gray	7, 729, 400	180, 588	2, 000	130		
Spotted	1, 849, 100	96, 165	13, 500	945	56, 000	4, 480
Striped bass	362, 000	35, 675				
Sturgeon	1, 600	160	50, 000	3, 500	11, 600	928
Sunfish	100	1				
White perch	522, 200	22, 343				
Yellow perch	17, 200	480				
Total	154, 567, 900	1, 395, 596	1, 168, 400	63, 063	19. 233, 900	116. 490
SHELLFISH, ETC.						
Crabs:						
Hard [1]	4, 543, 600	67, 238	8, 000	160	483, 500	7, 252
Soft	251, 400	36, 210				
Shrimp	2, 563, 900	80, 367	1, 801, 400	54, 042	6, 842, 900	203, 127
Clams, hard, public [2]	338, 000	33, 647	47, 000	5, 862		
Octopus			1, 500	90		
Oysters:[3]						
Market, public, spring	436, 700	18, 117	1, 329, 100	41, 347		
Market, public, fall	699, 300	33, 125	471, 500	17, 684		
Market, private, spring	21, 700	1, 550	614, 600	22, 169	327, 600	16, 588
Market, private, fall	3, 000	300	446, 700	20, 574	241, 100	14, 773
Scallops, bay	36, 000	6, 000				
Terrapin, diamond back	400	75	3, 000	300	11, 900	1, 280
Total	8, 894, 000	276, 629	4. 722. 800	162, 228	7, 907, 000	243, 020
Grand total	163, 461, 900	1, 672, 225	5, 891, 200	225, 291	27, 140, 900	359, 510

Species	Florida		Alabama		Mississippi	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	214, 900	$1, 055				
Amberjack	4, 000	80				
Black bass	422, 900	25, 195				
Bluefish	1, 933, 900	100, 675	28, 600	$754		
Blue runner or hardtail	181, 100	3, 074	2, 900	58		
Buffalofish			18, 600	744		
Cabio or crab eater	7, 400	181				
Catfish and bullheads	2, 854, 200	93, 477	120, 600	7, 636	30, 300	$606
Cigarfish	4, 500	90				
Crappie	462, 300	11, 956				
Crevalle	111, 000	1, 565	2, 600	58		
Croaker	52, 400	1, 194	21, 200	386	13, 600	339
Dolphin	8, 000	240				
Drum:						
Black	100, 100	2, 165	700	20	3, 800	59
Red or redfish	1, 016, 900	24, 277	64, 700	2, 442	73, 000	2, 888
Eels	18, 400	553				

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued						
Flounders	74, 800	$3, 142	35, 900	$2, 718	42, 000	$2, 410
Groupers	3, 341, 400	79, 490	151, 200	3, 356	55, 000	1, 250
Grunts	40, 300	1, 138				
Hickory shad	42, 900	352				
Hogfish	6, 000	180				
Jewfish	13, 400	408				
Kingfish or "king mackerel"	2, 638, 100	116, 097				
King whiting or "kingfish"	324, 600	7, 844	4, 800	90	3, 600	89
Mackerel	200	9				
Menhaden	38, 983, 400	121, 643				
Mojarro	19, 100	391				
Mullet	23, 966, 300	641, 127	1, 168, 200	28, 387	644, 500	14, 222
Muttonfish	198, 900	8, 839				
Paddlefish or spoonbill cat			600	36		
Permit	1, 700	34				
Pigfish	94, 800	1, 823				
Pinfish or sailors choice	31, 000	620				
Pompano	437, 500	78, 134	1, 800	270		
Porgies	38, 500	934				
Sawfish	17, 500	35				
Sea bass	52, 000	2, 022				
Sea catfish	105, 000	210				
Shad	782, 200	66, 986				
Sharks	3, 217, 500	8, 535				
Sheepshead	605, 900	13, 266	8, 000	305	23, 000	920
Skates	175, 000	350				
Snapper:						
Mangrove	228, 700	7, 017				
Red	4, 067, 800	224, 271	950, 500	51, 859	123, 200	6, 720
Snook or sergeantfish	421, 800	9, 946				
Spanish mackerel	6, 734, 200	271, 787	11, 900	533		
Spot	85, 100	1, 687	7, 700	141		
Squeteagues or "sea trout":						
Gray	10, 000	500				
Spotted	3, 083, 200	163, 275	137, 500	9, 153	146, 900	8, 814
White	14, 300	296	7, 600	176	153, 500	3, 838
Sturgeon	1, 000	60	8, 400	912		
Sunfish	517, 500	13, 544				
Tenpounder	27, 500	482	1, 200	12		
Tripletail	600	12				
Tuna or "horse mackerel"	4, 300	161				
Turbot	1, 500	45				
Wahoo	2, 000	60				
White perch	18, 200	728				
Yellowtail	81, 400	4, 677				
Total	97, 899, 100	2, 117, 934	2, 755, 200	110, 046	1, 312, 400	42, 155
SHELLFISH, ETC.						
Crabs:						
Hard [1]	182, 800	3, 474	257, 400	3, 677	602, 700	7, 114
King	500, 000	600				
Soft			1, 600	312	4, 200	720
Stone	80, 600	5, 737				
Sea crawfish or "spiny lobster"	351, 300	17, 166				
Shrimp	16, 292, 200	497, 870	4, 556, 600	115, 176	15, 329, 800	292, 522
Clams:						
Coquina	5, 800	975				
Hard, public [2]	535, 000	26, 082				
Conchs	2, 500	75				
Oysters: [3]						
Market, public, spring	827, 400	40, 572	195, 500	11, 509	3, 749, 800	244, 374
Market, public, fall	509, 700	30, 573	164, 600	9, 685	1, 154, 100	65, 416
Market, private, spring	361, 800	16, 656	5, 400	450		
Market, private, fall	337, 100	13, 830	26, 300	2, 190		
Scallops:						
Bay	74, 100	6, 596				
Sea	120, 200	17, 891				
Terrapin, diamond back			1, 400	361		
Turtles:						
Green	4, 600	244				
Soft shell	61, 200	797				
Sponges:						
Grass	45, 400	24, 699				
Sheepswool	458, 500	720, 257				
Velvet	200	110				
Wire	14, 400	7, 894				
Yellow	136, 800	84, 690				
Total	20, 901, 600	1, 516, 788	5, 208, 800	143, 360	20, 840, 600	610, 146
Grand total	118, 800, 700	3, 634, 722	7, 964, 000	253, 406	22, 153, 000	652, 301

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					15,111,900	$91,956
Amberjack					4,000	80
Black bass					424,400	25,270
Bluefish					3,732,000	165,124
Blue runner or hardtail					184,000	3,132
Bowfin					600	6
Buffalofish					18,600	744
Butterfish					43,500	745
Cabio or crab eater					7,400	181
Carp					108,600	4,316
Catfish and bullheads	197,000	$6,870	63,100	$1,712	3,480,300	116,624
Cero					4,400	220
Cigarfish					4,500	90
Crappie					462,300	11,956
Crevalle	1,100	35			114,700	1,658
Croaker	300,900	15,177	296,100	9,333	8,374,000	117,767
Dolphin					8,000	240
Drum:						
Black	198,500	7,128	2,252,700	59,648	2,555,800	69,020
Red or redfish	492,500	28,200	1,579,100	95,433	3,364,700	156,220
Eels					62,700	2,596
Flounders	24,300	1,895	97,700	8,469	1,297,000	62,655
Garfish	500	2			500	2
Gizzard shad					24,000	230
Groupers	18,400	770	3,700	80	3,569,700	84,946
Grunts					49,400	1,411
Harvestfish or "starfish"					820,000	12,325
Hickory shad					157,600	6,478
Hogfish					6,000	180
Jewfish	5,000	140	28,300	695	46,700	1,243
Kingfish or "king mackerel"	13,400	445	9,600	384	2,661,100	116,926
King whiting or "kingfish"					661,000	16,063
Mackerel					200	9
Menhaden					164,386,000	541,005
Mojarro					19,100	391
Mullet	18,000	278	39,600	792	30,484,900	811,695
Muttonfish					198,900	8,839
Paddlefish or spoonbill cat					600	36
Permit					1,700	34
Pigfish					186,800	2,953
Pike or pickerel					1,200	66
Pinfish or sailors choice					211,000	1,520
Pompano			2,400	327	442,100	78,791
Porgies					38,500	934
Sawfish					17,500	35
Sea bass					256,600	10,317
Sea catfish					105,000	210
Shad					2,496,800	329,863
Sharks					3,229,500	8,655
Sheepshead	267,500	14,556	290,800	9,785	1,198,900	38,912
Skates					175,000	350
Snapper:						
Mangrove					228,700	7,017
Red	79,000	4,550	635,400	36,092	5,855,900	323,492
Snook or sergeantfish			6,500	565	428,300	10,511
Spadefish					6,000	150
Spanish mackerel	1,900	96	173,600	11,001	6,969,300	285,775
Spot	1,900	67			4,906,200	75,705
Squeteagues or "sea trout":						
Gray					7,741,400	181,218
Spotted	1,073,000	87,046	2,351,700	173,413	8,710,900	543,291
White	444,900	11,038	110,200	2,951	730,500	18,299
Striped bass					362,000	35,675
Sturgeon					72,600	5,560
Sunfish					517,600	13,545
Tenpounder					28,700	494
Tripletail	200	4			800	16
Tuna or "horse mackerel"					4,300	161
Turbot					1,500	45
Wahoo					2,000	60
White perch					540,400	23,071
Yellow perch					17,200	480
Yellowtail					81,400	4,677
Total	3,138,000	178,297	7,940,500	410,680	288,015,400	4,434,261

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
SHELLFISH, ETC.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:						
Hard [1]	11,676,500	$163,942	258,100	$12,704	18,012,600	$265,561
King	----------	----------	----------	----------	500,000	600
Soft	651,200	85,569	----------	----------	908,400	122,811
Stone	----------	----------	----------	----------	80,600	5,737
Sea crawfish or "spiny lobster"	----------	----------	----------	----------	351,300	17,166
Shrimp	55,572,300	1,442,370	16,358,600	383,054	119,317,700	3,068,528
Clams:						
Coquina	----------	----------	----------	----------	5,800	975
Hard, public [2]	----------	----------	----------	----------	920,000	65,591
Conchs	----------	----------	----------	----------	2,500	75
Octopus	----------	----------	----------	----------	1,500	90
Oysters: [3]						
Market, public, spring	1,043,700	79,316	689,700	54,084	8,271,900	489,319
Market, public, fall	276,400	34,205	622,100	51,120	3,897,700	241,808
Market, private, spring	1,972,700	132,580	----------	----------	3,303,800	189,993
Market, private, fall	2,298,900	168,214	----------	----------	3,353,100	219,881
Scallops:						
Bay	----------	----------	----------	----------	110,100	12,596
Sea	----------	----------	----------	----------	120,200	17,891
Terrapin, diamond back	----------	----------	----------	----------	16,700	2,016
Turtles:						
Green	----------	----------	----------	----------	4,600	244
Loggerhead	3,500	70	----------	----------	3,500	70
Soft shell	----------	----------	----------	----------	61,200	797
Sponges:						
Grass	----------	----------	----------	----------	45,400	24,699
Sheepswool	----------	----------	----------	----------	458,500	720,257
Velvet	----------	----------	----------	----------	200	110
Wire	----------	----------	----------	----------	14,400	7,894
Yellow	----------	----------	----------	----------	136,800	84,690
Total	73,495,200	2,106,266	17,928,500	500,962	159,898,500	5,559,399
Grand total	76,633,200	2,284,563	25,869,000	911,642	447,913,900	9,993,660

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[1] Statistics on hard crabs used in this table are based on yields of 4 pounds per dozen in North Carolina and South Carolina; 6 pounds in Georgia; 6.28 pounds in Florida; 7 pounds in Alabama; 6.09 pounds in Mississippi; 5.43 pounds in Louisiana; and 5.5 pounds in Texas.

[2] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States.

[3] Statistics on market oysters used in this table are based on yields of 5.58 pounds of meats per bushel in North Carolina; 4.74 in South Carolina; 5.88 in Georgia; 3.57 in Florida; 3.29 in Alabama; 2.22 in Mississippi; 4.32 in Louisiana; and 4.41 in Texas.

NOTE.—The catch for Mississippi includes the following products taken by Mississippi craft in Louisiana waters: Shrimp, 8,734,100 pounds, valued at $166,360; oysters, market, spring, 3,667,700 pounds of meats, valued at $237,876, and oysters, market, fall, 938,100 pounds, valued at $49,790. Of the total catch for Florida all of the mackerel and sea scallops were taken off the coast of New York. In addition 114,600 pounds of bluefish, valued at $8,938, and 1,300 pounds of tuna or "horse mackerel" valued at $41, were taken in the same waters. The seed oyster fishery was prosecuted in this section only in North Carolina where 12 regular fishermen using 6 sail boats and 12 dredges took 17,450 bushels of seed oysters, valued at $2,617 from public beds. All of these fishermen, craft, and gear were duplicated among those in the fisheries for market oysters or other species.

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	North Carolina		South Carolina		Georgia	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard .... number	13,630,800	$67,238	24,000	$160	967,000	$7,252
Soft .... do	1,005,600	36,210	----------	----------	----------	----------
Clams, hard, public .... bushels	42,250	33,647	5,875	5,862	----------	----------
Oysters:						
Market, public, spring .... do	78,262	18,117	280,401	41,347	----------	----------
Market, public, fall .... do	125,323	33,125	99,473	17,684	----------	----------
Market, private, spring .... do	3,889	1,550	129,662	22,169	55,714	16,588
Market, private, fall .... do	538	300	94,241	20,574	41,003	14,773
Scallops:						
Bay .... do	6,000	6,000	----------	----------	----------	----------
Sea .... do	----------	----------	----------	----------	----------	----------

Fisheries of the South Atlantic and Gulf States, 1934—Continued

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS—Continued

Product	Florida		Alabama		Mississippi	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard……number	349, 148	$3, 474	440, 154	$3, 677	1, 187, 319	$7, 114
Soft……do	--------	--------	4, 800	312	12, 600	720
Clams, hard, public……bushels	66, 875	26, 082	--------	--------	--------	--------
Oysters:						
Market, public, spring……do	231, 765	40, 572	59, 422	11, 599	1, 689, 099	244, 374
Market, public, fall……do	142, 773	30, 573	50, 030	9, 685	519, 865	65, 416
Market, private, spring……do	101, 345	16, 656	1, 641	450	--------	--------
Market, private, fall……do	94, 426	13, 830	7, 994	2, 190	--------	--------
Scallops:						
Bay……do	13, 981	6, 596	--------	--------	--------	--------
Sea……do	20, 333	17, 891	--------	--------	--------	--------

Product	Louisiana		Texas		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard……number	25, 805, 065	$163, 942	562, 658	$12, 704	42, 966, 144	$265, 561
Soft……do	1, 645, 136	85, 569	--------	--------	2, 668, 136	122, 811
Clams, hard, public……bushels	--------	--------	--------	--------	115, 000	65, 591
Oysters:						
Market, public, spring……do	241, 597	79, 316	156, 395	54, 084	2, 736, 941	489, 319
Market, public, fall……do	63, 981	34, 205	141, 066	51, 120	1, 142, 511	241, 808
Market, private, spring……do	456, 644	132, 580	--------	--------	748, 895	189, 993
Market, private, fall……do	532, 153	168, 214	--------	--------	770, 355	219, 881
Scallops:						
Bay……do	--------	--------	--------	--------	19, 981	12, 596
Sea……do	--------	--------	--------	--------	20, 333	17, 891

NOTE.—The Mississippi production includes the following products taken in Louisiana waters by Mississippi craft: Oysters, market, spring, 1,669,910 bushels, valued at $237,876, and oysters, market, fall, 461,487 bushels, valued at $49,790.

Industries related to the fisheries of the South Atlantic and Gulf States, 1934

OPERATING UNITS, SALARIES, AND WAGES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Transporting:									
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	87	104	23	56	10	--------	117	--------	397
On boats	11	58	10	86	--------	10	6	--------	181
Total	98	162	33	142	10	10	123	--------	578
Vessels:									
Motor	48	10	7	31	5	--------	56	--------	157
Net tonnage	427	120	86	456	37	--------	505	--------	1, 631
Sail	--------	33	--------	--------	--------	--------	--------	--------	33
Net tonnage	--------	301	--------	--------	--------	--------	--------	--------	301
Total vessels	48	43	7	31	5	--------	56	--------	190
Total net tonnage	427	421	86	456	37	--------	505	--------	1, 932
Boats	9	58	5	88	--------	5	3	--------	168
Wholesale and manufacturing:									
Establishments	84	31	29	241	20	40	103	43	591
Persons engaged:									
Proprietors	104	40	37	253	15	37	109	42	637
Salaried employees	21	18	15	157	31	56	85	26	409
Wage earners:									
Average for season	1, 269	564	945	1, 796	357	2, 382	4, 452	1, 543	13, 308
Average for year	465	223	235	916	178	874	1, 031	278	4, 200
Paid to salaried employees	$55, 397	$34, 020	$31, 001	$242, 609	$34, 046	$86, 119	$138, 963	$52, 963	$675, 118
Paid to wage earners	$219, 778	$112, 743	$127. 355	$544, 963	$67, 951	$302, 140	$634, 720	$189, 044	$2,198,694
Total salaries and wages	$275, 175	$146, 763	$158, 356	$787, 572	$101, 997	$388, 259	$773, 683	$242, 007	$2,873,812
Fishermen manufacturing	267	8	14	402	122	61	50	63	987

See footnotes at end of table.

Industries related to the fisheries of the South Atlantic and Gulf States, 1934—Con.

PRODUCTS MANUFACTURED

Item	North Carolina		South Carolina		Georgia		Florida	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Valu*
By manufacturing establishments:								
Alewife roe, canned standard cases	5,665	$16,609	-------	-------	-------	-------	-------	-------
Groupers, fresh steaks pounds	-------	-------	-------	-------	-------	-------	341,299	$45,919
Menhaden products:								
Acid scrap tons	4,768	85,800	-------	-------	(1)	(1)	4,140	70,218
Dry scrap do	3,207	107,552	-------	-------	-------	-------	6,523	211,066
Fish meal do	(1)	(1)	-------	-------	-------	-------	1,885	71,240
Oil gallons	407,000	72,960	-------	-------	(1)	(1)	555,250	100,468
Mullet, salted pounds	507,300	22,419	-------	-------	-------	-------	337,800	17,290
Crab meat, packaged, fresh cooked pounds	437,042	143,437	-------	-------	57,500	$15,095	16,700	6,300
Shrimp:								
Cooked and peeled do	-------	-------	-------	-------	(1)	(1)	-------	-------
Canned standard cases	-------	-------	(1)	(1)	101,411	498,637	48,567	234,888
Crawfish meat, packaged, fresh cooked pounds	-------	-------	-------	-------	-------	-------	56,500	21,738
Clams, hard, canned chowder standard cases	-------	-------	-------	-------	-------	-------	746	2,873
Marine-shell products, novelties	-------	-------	-------	-------	-------	-------	-------	7,900
Oysters:								
Fresh shucked gallons	109,645	93,945	40,901	$40,901	32,207	32,742	115,667	150,770
Canned standard cases	-------	-------	91,752	392,551	(1)	(1)	12,980	51,331
Shell products:								
Poultry feed tons	(1)	(1)	(1)	(1)	-------	-------	54,477	264,403
Lime do	950	4,175	(1)	(1)	-------	-------	(1)	(1)
Unclassified products:								
Packaged, fresh and frozen pounds	[3] 16,000	[3] 2,200	-------	-------	-------	-------	[3] 109,197	[3] 22,600
Canned standard cases	-------	-------	(5)	(5)	(5)	(5)	[6] 18,488	[6] 123,525
Miscellaneous	-------	[7] 60,845	-------	[8] 92,849	-------	[9] 94,522	-------	[10] 35,889
Total	-------	609,942	-------	526,301	-------	640,996	-------	1,438,418
By fishermen:								
Alewives:								
Corned pounds	3,542,000	37,090	-------	-------	-------	-------	-------	-------
Tight-pack cut do	54,200	2,168	-------	-------	-------	-------	-------	-------
Tight-pack roe do	103,700	5,185	-------	-------	-------	-------	-------	-------
Mullet:								
Salted do	10,000	400	-------	-------	-------	-------	-------	-------
Smoked do	-------	-------	-------	-------	-------	-------	4,500	1,175
Roe, salted do	-------	-------	-------	-------	-------	-------	153,700	9,222
Oysters, fresh shucked gallons	4,850	3,790	957	957	7,335	7,335	10,319	13,298
Scallops, bay, fresh shucked do	4,000	8,000	-------	-------	-------	-------	7,260	7,560
Crab meat, packaged, fresh cooked pounds	-------	-------	-------	-------	-------	-------	5,295	1,733
Total	-------	56,633	-------	957	-------	7,335	-------	32,988
Grand total	-------	666,575	-------	527,258	-------	648,331	-------	1,471,406

Item	Alabama		Mississippi		Louisiana		Texas	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Mullet, salted pounds	-------	-------	(1)	(1)	-------	-------	-------	-------
Crab meat, packaged, fresh cooked pounds	-------	-------	77,500	$20,025	350,778	$72,144	-------	-------
Shrimp:								
Fresh and frozen packaged pounds	-------	-------	-------	-------	-------	-------	2,299,800	$379,467
Cooked and peeled do	-------	-------	592,415	130,332	-------	-------	61,399	11,162
Sun dried do	-------	-------	-------	-------	1,762,974	265,344	-------	-------
Canned standard cases	(1)	(1)	161,119	671,513	520,970	2,206,696	(1)	(1)
Meal tons	-------	-------	-------	-------	904	14,609	-------	-------
Oysters:								
Fresh shucked gallons	15,390	$19,238	54,631	92,873	207,248	313,993	74,506	109,345
Canned standard cases	(1)	(1)	195,857	822,031	49,133	201,793	-------	-------
Shell products:								
Poultry feed tons	(1)	(1)	14,029	67,745	(1)	(1)	19,486	86,293
Lime do	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

See footnotes at end of table.

Industries related to the fisheries of the South Atlantic and Gulf States, 1934—Con.

PRODUCTS MANUFACTURED—Continued

Item	Alabama		Mississippi		Louisiana		Texas	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued.								
Unclassified products:								
Packaged, fresh and frozen pounds	[4] 22,300	[4] $4, 406	-------	---------	-------	---------	-------	---------
Canned standard cases	(5)	(5)	-------	---------	(5)	(5)	(5)	(5)
Miscellaneous	-------	[11] 323,797	-------	[12] $1, 100	-------	[13] $430,980	-------	[14] $446,052
Total	-------	347, 441	-------	1, 805, 619	-------	3, 505, 559	-------	1, 032, 319
By fishermen:								
Mullet:								
Salted pounds	10, 000	500	-------	---------	-------	---------	-------	---------
Oysters, fresh shucked gallons	11, 360	11, 915	2, 614	2, 614	-------	---------	8, 929	10, 367
Crab meat, packaged, fresh cooked pounds	19, 700	4, 925	-------	---------	-------	---------	3, 860	641
Shrimp, sun dried do	-------	-------	-------	---------	7, 500	825	-------	---------
Total	-------	17, 340	-------	2, 614	-------	825	-------	11, 008
Grand total	-------	364, 781	-------	1, 808, 233	-------	3, 506, 384	-------	1, 043, 327

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[1] This item has been included under "Unclassified products."

[2] Includes fresh fillets of croaker, sea bass and squeteagues, and fresh pandressed croaker.

[3] Includes fresh and frozen fillets of flounders, groupers, mullet, red snapper, snook, spanish mackerel, and squeteagues, and fresh steaks of red snapper.

[4] Includes fresh steaks of grouper and red snapper; and fresh and frozen fillets of flounders, red snapper, spanish mackerel, and squeteagues.

[5] This item has been included under "Miscellaneous."

[6] Includes canned coquina broth, hard-clam products, conch chowder, fish chowder, and turtle products.

[7] Includes corned alewives, salted spot, menhaden fish meal, and oyster-shell poultry feed.

[8] Includes canned shrimp and oyster-shell products.

[9] Includes cooked and peeled shrimp and pickled shrimp; canned oysters and terrapin products; and menhaden products.

[10] Includes fresh-shucked bay scallops; salted mullet roe; smoked fillets of kingfish, mullet, and Spanish mackerel; shark hides, fins and oil; king crab scrap; fish meal; and oyster-shell lime.

[11] Includes canned shrimp and oysters, and oyster-shell products.

[12] Includes salted mullet and oyster-shell lime.

[13] Includes canned frog products and oyster-shell products.

[14] Includes canned shrimp and oyster-shell lime.

NOTE.—The total value of the products for the South Atlantic and Gulf States was as follows: By manufacturing establishments, $9,906,595; and by fishermen, $129,700. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 862 have also been included as fishermen and 203 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

NORTH CAROLINA

Fisheries of North Carolina, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets			
	Menhaden	Other	Common	Long	Anchor	Drift	Runaround	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	431	--------	12	126	51	12	--------	--------
On boats and shore:								
Regular	24	7	864	251	392	235	93	308
Casual	--------	--------	389	71	195	104	110	112
Total	455	7	1, 265	448	638	351	203	420
Vessels:								
Motor	28	--------	2	37	18	4	--------	--------
Net tonnage	899	--------	12	259	113	24	--------	--------
Boats:								
Motor	3	1	171	100	257	108	49	220
Other	6	2	400	95	152	59	101	137
Accessory boats	63	--------	--------	47	--------	--------	--------	--------
Apparatus:								
Number	31	1	412	87	1, 840	220	159	4, 931
Length, yards	7, 940	175	53, 160	86, 475	--------	--------	--------	--------
Square yards	--------	--------	--------	--------	1, 128, 700	469, 170	66, 730	388, 205

Fisheries of North Carolina, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines				Pound nets	Weirs	Wheels	Fyke nets	Dip nets
	Hand	Troll	Trot with baits or snoods	Trot with hooks					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	6								
On boats and shore:									
Regular	30	70	268		309			11	190
Casual	50		216	50	226	12	22	24	290
Total	86	70	484	50	535	12	22	35	480
Vessels:									
Motor	1								
Net tonnage	10								
Sail	1								
Net tonnage	8								
Total, vessels	2								
Total, net tonnage	18								
Boats:									
Motor	40	35	200		243	2	14	25	10
Other			151	34	192	10	13	14	285
Accessory boats	2								
Apparatus:									
Number	81	45	423	50	1,522	12	33	480	480
Hooks, baits, or snoods	172	45	342,800	6,200					

Item	Otter trawls, shrimp	Pots		Spears	Dredges, oyster	Tongs, oyster	Rakes, other than for oysters	By hand, other than for oysters	Total, exclusive of duplication
		Eel	Fish						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	47				89				723
On boats and shore:									
Regular	208	10		15	106	47	191		2,620
Casual	12	13	43	50		202	240	30	2,012
Total	267	23	43	65	195	249	431	30	5,355
Vessels:									
Motor	20								93
Net tonnage	132								1,340
Sail					29				30
Net tonnage					290				298
Total, vessels	20				29				123
Total, net tonnage	132				290				1,638
Boats:									
Motor	110				1	18			1,344
Other		23	27	55	52	172	406	30	1,829
Accessory boats									112
Apparatus:									
Number	130	750	730	65	143	249	431		
Yards, at mouth	2,634				147				

Fisheries of North Carolina, 1934—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	----	----	----	----	1, 053, 500	$10, 040	377, 000	$3, 785
Black bass	----	----	----	----	700	37	800	38
Bluefish	15, 000	$750	----	----	288, 300	11, 035	365, 000	13, 050
Bowfin	----	----	----	----	600	6	----	----
Butterfish	----	----	----	----	27, 000	440	----	----
Carp	----	----	----	----	53, 000	1, 920	35, 000	1, 700
Catfish and bullheads	----	----	----	----	43, 000	560	27, 000	390
Croaker	----	----	----	----	503, 200	5, 942	3, 109, 000	40, 560
Drum, red or redfish	----	----	----	----	26, 600	562	31, 000	620
Flounders	----	----	----	----	257, 700	11, 905	136, 000	3, 625
Gizzard shad	----	----	----	----	5, 500	53	6, 500	57
Harvestfish or "starfish"	----	----	----	----	51, 000	570	12, 000	240
Hickory shad	----	----	----	----	7, 000	380	----	----
King whiting or "kingfish"	----	----	----	----	104, 000	2, 050	5, 000	50
Menhaden	106, 104, 800	353, 766	----	----	300, 000	916	246, 300	821
Mullet	250, 000	5, 000	----	----	2, 201, 500	59, 295	500	15
Pigfish	----	----	----	----	42, 000	630	50, 000	500
Pike or pickerel	----	----	----	----	200	12	----	----
Pinfish or sailors choice	----	----	----	----	30, 000	150	150, 000	750
Pompano	----	----	----	----	400	60	----	----
Shad	----	----	----	----	38, 000	5, 820	----	----
Sheepshead	----	----	----	----	1, 400	35	----	----
Spadefish	----	----	----	----	6, 000	150	----	----
Spanish mackerel	----	----	----	----	2, 800	127	----	----
Spot	----	----	----	----	1, 401, 000	21, 610	2, 525, 000	39, 375
Squeteagues or "sea trout":								
Gray	----	----	----	----	443, 000	8, 400	1, 634, 000	38, 670
Spotted	----	----	----	----	277, 500	15, 165	1, 345, 000	69, 490
Striped bass	----	----	20, 000	$2, 000	72, 500	6, 725	66, 800	6, 680
Sturgeon	----	----	----	----	1, 000	100	----	----
Sunfish	----	----	----	----	100	1	----	----
White perch	----	----	----	----	56, 000	2, 300	72, 000	2, 820
Yellow perch	----	----	----	----	9, 200	295	200	8
Crabs, soft	----	----	----	----	138, 000	19, 200	----	----
Terrapin, diamond back	----	----	----	----	400	75	----	----
Total	106, 369, 800	359, 516	20, 000	2, 000	7, 442, 100	186, 566	10, 194, 100	223, 244

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	751, 300	$6, 556	225, 000	$1, 625	----	----	79, 000	$790
Bluefish	112, 500	3, 375	321, 000	12, 650	----	----	425, 000	13, 350
Butterfish	3, 000	60	----	----	----	----	1, 000	20
Croaker	2, 261, 500	26, 215	300, 000	3, 000	10, 000	$100	695, 000	7, 150
Drum, red or redfish	15, 000	375	----	----	----	----	26, 000	525
Gizzard shad	3, 500	35	----	----	----	----	----	----
Hickory shad	46, 800	2, 270	----	----	----	----	7, 500	315
King whiting or "kingfish"	174, 000	4, 650	----	----	----	----	----	----
Mullet	62, 500	1, 275	25, 000	500	1, 060, 000	30, 550	286, 000	8, 540
Sea bass	10, 000	450	----	----	5, 000	225	----	----
Shad	301, 300	45, 845	114, 000	17, 020	----	----	275, 500	41, 390
Spanish mackerel	----	----	----	----	----	----	2, 000	80
Spot	110, 000	1, 650	30, 000	600	80, 000	1, 450	310, 000	3, 800
Squeteagues or "sea trout":								
Gray	1, 263, 000	41, 700	240, 000	7, 200	10, 000	250	660, 000	15, 875
Spotted	5, 000	350	14, 000	740	5, 000	250	160, 000	8, 000
Striped bass	73, 800	7, 380	500	50	----	----	13, 000	1, 300
Sturgeon	----	----	600	60	----	----	----	----
White perch	32, 000	1, 140	----	----	----	----	----	----
Total	5, 225, 200	143, 326	1, 270, 100	43, 445	1, 170, 000	32, 825	2, 940, 000	101, 135

Fisheries of North Carolina, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			8,000	$240				
Catfish and bullheads							4,500	$190
Cero			4,400	220				
Sea bass	60,000	$2,350						
Spanish mackerel			22,000	1,100				
Striped bass							20,000	2,000
Crabs, hard					4,543,600	$67,238		
Total	60,000	2,350	34,400	1,560	4,543,600	67,238	24,500	2,190

Species	Pound nets		Weirs		Wheels		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	11,850,200	$64,995			450,000	$2,500	11,000	$110
Bluefish	231,700	9,065						
Butterfish	12,500	225						
Carp	6,500	129	3,000	$90			11,100	477
Catfish and bullheads	25,100	673					63,000	1,360
Croaker	804,100	8,091						
Drum, red or redfish	33,900	668						
Eels							4,900	194
Flounders	567,900	25,897					900	33
Gizzard shad	5,500	55					3,000	30
Harvestfish or "starfish"	757,000	11,515						
Hickory shad	36,400	1,569					2,000	100
King whiting or "kingfish"	11,000	330						
Mullet	3,800	114						
Pike or pickerel							1,000	54
Sea bass	400	20						
Shad	545,200	83,112						
Sheepshead	2,300	45						
Spanish mackerel	20,900	1,051						
Spot	332,000	4,550						
Squeteagues or "sea trout":								
Gray	3,479,400	68,493						
Spotted	42,600	2,170						
Striped bass	92,400	9,240					3,000	300
White perch	133,200	4,053					24,000	780
Yellow perch	1,500	35					6,300	142
Total	18,995,500	296,095	3,000	90	450,000	2,500	130,200	3,580

Species	Dip nets		Otter trawls, shrimp		Pots			
					Eel		Fish	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	100,000	$500						
Eels					39,400	$1,849		
Flounders			6,000	$120				
King whiting or "kingfish"			8,000	160				
White perch							205,000	$11,250
Crabs, soft	113,400	17,010						
Shrimp			2,563,900	80,367				
Total	213,400	17,510	2,577,900	80,647	39,400	1,849	205,000	11,250

Species	Spears		Dredges		Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	19,000	$570								
Clams, hard, public							330,000	$32,647	8,000	$1,000
Oysters:										
Market, public, spring			254,300	$10,202	182,400	$7,915				
Market, public, fall			512,600	24,030	186,700	9,095				
Market, private, spring					21,700	1,550				
Market, private, fall					3,000	300				
Scallops, bay							36,000	6,000		
Total	19,000	570	766,900	34,232	393,800	18,860	366,000	38,647	8,000	1,000

Fisheries of North Carolina, 1934—Continued

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Bertie	Bladen	Brunswick	Camden	Carteret	Chowan	Craven
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	14			67		590		
On boats and shore:								
Regular	176			255		759		42
Casual	42	110	30	100	9	285	152	72
Total	232	110	30	422	9	1, 634	152	114
Vessels:								
Motor				8		85		
Net tonnage				172		1, 168		
Sail	5					9		
Net tonnage	58					77		
Total vessels	5			8		94		
Total net tonnage	58			172		1, 245		
Boats:								
Motor	87	32	15	108	7	210	55	40
Other	83	37		97	7	520	55	35
Accessory boats				6		106		
Apparatus:								
Purse seines:								
Menhaden				3		28		
Length, yards				840		7, 100		
Haul seines:								
Common	11			17		219		9
Length, yards	4, 000			2, 450		8, 140		2, 100
Long	3	2				29		
Length, yards	3, 200	3, 075				33, 700		
Gill nets:								
Anchor	4			50	50	103	245	
Square yards	2, 000			45, 000	10, 000	181, 800	122. 500	
Drift			15	15		4		6
Square yards			15, 000	21, 000		11, 430		900
Runaround	7			40		23		5
Square yards	4, 900			16, 000		4, 600		2, 500
Stake	100					870		190
Square yards	7, 000					48, 400		10, 140
Lines:								
Hand				15		6		
Hooks				30		12		
Troll						45		
Hooks						45		
Trot with baits or snoods	122					6		
Baits or snoods	94, 500					4, 800		
Pound nets	95	144				80	350	50
Wheels		6						
Fyke nets					40			
Dip nets						330		
Otter trawls, shrimp				65		59		
Yards at mouth				1, 285		1, 229		
Pots, fish		40						
Spears				15				
Dredges, oyster	42					19		
Yards at mouth	44					19		
Tongs, oyster				20		132		
Rakes, other than for oysters						251		

Item	Currituck	Dare	Gates	Hertford	Hyde	Lenoir	Martin	New Hanover
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					2			
On boats and shore:								
Regular	118	666			120			95
Casual	160	10	18	8		8	233	72
Total	278	676	18	8	122	8	233	167
Vessels:								
Sail					1			
Net tonnage					6			
Boats:								
Motor	121	270	2	2	77	2	19	13
Other	129	226	12	2	41	2	124	108
Apparatus:								
Purse seines:								
Other		1						
Length, yards		175						
Haul seines:								
Common	44	50					3	15
Length, yards	9, 050	15, 800					1, 000	1, 800
Long	13	30						
Length, yards	10, 400	26, 100						

Fisheries of North Carolina, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Curri-tuck	Dare	Gates	Hert-ford	Hyde	Lenoir	Mar-tin	New Han-over
Apparatus—Continued.								
Gill nets:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Anchor	98	253	--------	--------	7	--------	--------	--------
Square yards	42, 800	149, 800	--------	--------	9, 400	--------	--------	--------
Drift	--------	62	--------	--------	--------	--------	32	75
Square yards	--------	310, 000	--------	--------	--------	--------	2, 540	105, 000
Runaround	--------	12	--------	--------	10	--------	--------	4
Square yards	--------	7, 200	--------	--------	5, 330	--------	--------	1, 400
Stake	--------	2, 550	10	--------	964	10	--------	--------
Square yards	--------	244, 000	1, 000	--------	61, 250	400	--------	--------
Lines:								
Hand	--------	--------	--------	--------	--------	--------	--------	20
Hooks	--------	--------	--------	--------	--------	--------	--------	40
Trot with baits or snoods	110	15	--------	--------	20	--------	--------	--------
Baits or snoods	104, 000	12, 000	--------	--------	15, 000	--------	--------	--------
Trot with hooks	--------	--------	--------	--------	--------	--------	38	12
Hooks	--------	--------	--------	--------	--------	--------	3, 800	2, 400
Pound nets	7	383	23	36	45	--------	--------	--------
Weirs	--------	--------	--------	--------	--------	--------	12	--------
Wheels	--------	--------	--------	--------	--------	--------	27	--------
Fyke nets	355	--------	--------	--------	--------	--------	--------	--------
Dip nets	--------	--------	--------	--------	--------	--------	150	--------
Pots:								
Eel	600	50	--------	--------	--------	--------	50	--------
Fish	--------	--------	--------	--------	--------	--------	690	--------
Dredges, oyster	--------	--------	--------	--------	22	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	22	--------	--------	--------
Tongs, oyster	--------	10	--------	--------	--------	--------	--------	--------
Rakes, other than for oysters	--------	--------	--------	--------	--------	--------	--------	60

Item	Onslow	Pam-lico	Pasquo-tank	Pender	Per-quim-ans	Tyr-rell	Wash-ing-ton
Fisherman:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	41	6	--------	--------	--------	--------
On boats and shore:							
Regular	64	112	50	144	--------	19	--------
Casual	165	171	--------	130	54	82	101
Total	232	324	56	274	54	101	101
Vessels:							
Sail	1	12	2	--------	--------	--------	--------
Net tonnage	8	111	38	--------	--------	--------	--------
Boats:							
Motor	66	91	24	9	27	42	25
Other	95	100	24	26	27	45	34
Apparatus:							
Haul seines:							
Common	24	--------	--------	18	--------	--------	2
Length, yards	4, 070	--------	--------	2, 850	--------	--------	1, 900
Long	--------	10	--------	--------	--------	--------	--------
Length, yards	--------	10, 000	--------	--------	--------	--------	--------
Gill nets:							
Anchor	18	--------	186	--------	386	200	240
Square yards	20, 000	--------	49, 800	--------	231, 600	120, 000	144, 000
Drift	--------	--------	--------	--------	--------	--------	11
Square yards	--------	--------	--------	--------	--------	--------	3, 300
Runaround	50	--------	--------	8	--------	--------	--------
Square yards	21, 600	--------	--------	3, 200	--------	--------	--------
Stake	--------	155	20	--------	--------	62	--------
Square yards	--------	5, 575	3, 000	--------	--------	7, 440	--------
Lines:							
Hand	40	--------	--------	--------	--------	--------	--------
Hooks	90	--------	--------	--------	--------	--------	--------
Trot with baits or snoods	60	90	--------	--------	--------	--------	--------
Baits or snoods	45, 000	67. 500	--------	--------	--------	--------	--------
Pound nets	--------	145	25	--------	18	85	36
Fyke nets	--------	--------	50	--------	--------	35	--------
Otter trawls, shrimp	--------	6	--------	--------	--------	--------	--------
Yards at mouth	--------	120	--------	--------	--------	--------	--------
Pots, eel	--------	50	--------	--------	--------	--------	--------
Spears	30	--------	--------	20	--------	--------	--------
Dredges, oyster	--------	56	4	--------	--------	--------	--------
Yards at mouth	--------	56	6	--------	--------	--------	--------
Tongs, oyster	40	37	--------	10	--------	--------	--------
Rakes, other than for oysters	10	--------	--------	110	--------	--------	--------

Fisheries of North Carolina, 1934—Continued

CATCH: BY COUNTIES

Species	Beaufort		Bertie		Bladen		Brunswick	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	677,400	$4,524	5,468,800	$31,306				
Bluefish	700	25					55,000	$1,950
Carp	7,500	75	200	6				
Catfish and bullheads	30,000	300	7,000	210				
Croaker	129,600	1,596					20,000	200
Drum, red or redfish	1,000	20					600	12
Flounders	32,600	978					18,000	480
Harvestfish or "starfish"	62,000	890						
Hickory shad	5,000	250	400	24				
King whiting or "kingfish"							12,500	295
Menhaden							20,458,200	68,192
Mullet	76,000	1,680					700,000	14,000
Sea bass							25,000	1,125
Shad	49,200	7,672	18,900	2,935	6,000	$900	41,500	6,225
Spanish mackerel	1,400	56						
Spot	26,000	395					123,000	2,490
Squeteagues or "sea trout":								
Gray	317,400	5,358						
Spotted	30,000	1,150					1,500	135
Striped bass	24,900	1,965	20,900	2,090				
Sturgeon	1,000	100						
White perch	12,000	480	12,000	540				
Yellow perch	7,500	225						
Crabs, hard	1,655,000	24,825						
Shrimp							1,309,900	40,547
Clams, hard, public							8,000	1,000
Oysters:								
Market, public, spring	55,000	2,360						
Market, public, fall	185,000	8,360					15,000	750
Total	3,386,200	63,284	5,528,200	37,111	6,000	900	22,788,200	137,401

Species	Camden		Carteret		Chowan		Craven	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	26,000	$260	5,500	$55	4,671,300	$23,356	45,000	$450
Bluefish			363,500	10,905			12,000	240
Butterfish			7,000	140				
Carp	600	12						
Catfish and bullheads	12,000	240			4,100	123		
Cero			4,400	220				
Croaker			4,541,000	59,340			55,000	550
Drum, red or redfish			37,000	875			5,000	100
Flounders			68,900	2,606			6,000	180
Gizzard shad	1,500	15						
Harvestfish or "starfish"			128,000	1,960			60,000	900
Hickory shad	300	15	11,500	265	2,500	125	2,500	50
King whiting or "kingfish"			95,500	2,865				
Menhaden			86,192,900	287,311				
Mullet	2,500	75	1,154,000	34,580			400,000	10,000
Pigfish			92,000	1,130				
Pike or pickerel	400	18						
Pinfish or sailors choice			180,000	900				
Pompano			400	60				
Sea bass			5,000	150				
Shad	3,000	450	115,000	18,400	65,300	9,795	68,500	10,060
Sheepshead			2,900	65			800	15
Spadefish			6,000	150				
Spanish mackerel			32,000	1,580			5,000	250
Spot			3,221,000	47,340			12,000	180
Squeteagues or "sea trout":								
Gray			3,067,000	78,885			700,000	10,500
Spotted			613,000	32,880			50,000	3,500
Striped bass	3,000	300	800	80	18,700	1,870	6,500	650
White perch	16,000	480			18,000	540		
Yellow perch	1,000	20	200	8				
Crabs:								
Hard			136,200	2,042				
Soft			231,400	34,710				
Shrimp			1,204,000	38,320				
Clams, hard, public			254,000	23,447				
Oysters:								
Market, public, spring			114,600	5,294				
Market, public, fall			169,800	8,510				
Market, private, spring			4,200	300				
Market, private, fall			3,000	300				
Scallops, bay			36,000	6,000				
Terrapin, diamond back			400	75				
Total	66,300	1,885	102,098,100	701,748	4,779,900	35,809	1,428,300	37,625

Fisheries of North Carolina, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Currituck		Dare		Gates		Hertford	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,000	$40	45,000	$300	150,000	$750	175,000	$875
Black bass	1,500	75						
Bluefish	300	15	1,020,000	40,850				
Bowfin	600	6						
Butterfish			24,000	380				
Carp	80,000	3,760	11,000	220				
Catfish and bullheads	29,000	580	24,000	330				
Croaker	7,200	72	1,075,000	10,750				
Drum, red or redfish			58,000	1,110				
Eels	38,400	1,539	1,500	150				
Flounders	4,400	198	672,000	33,260				
Gizzard shad	12,000	110						
Harvestfish or "starfish"			115,000	1,725				
Hickory shad			18,500	925				
King whiting or "kingfish"	7,000	280	81,000	1,230				
Mullet	1,000	30	168,000	5,040				
Pike or pickerel	400	30						
Shad	31,300	5,345	511,500	76,625	2,500	375	300	45
Spanish mackerel	100	5	3,300	192				
Spot	15,000	300	455,000	7,075				
Squeteagues or "sea trout":								
Gray	5,000	200	1,760,000	43,875				
Spotted	7,000	690	1,004,000	50,200				
Striped bass	47,500	4,750	116,000	11,600			200	20
Sunfish	100	1						
White perch	92,700	3,608	30,000	1,100				
Yellow perch	2,000	82						
Crabs:								
Hard	988,900	14,833	366,000	4,575				
Soft	20,000	1,500						
Oysters, market, public, spring			3,200	125				
Total	1,393,400	38,049	7,562,000	291,737	152,500	1,125	175,500	940

Species	Hyde		Lenoir		Martin		New Hanover	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					875,000	$4,375		
Bluefish	305,500	$9,165					1,000	$50
Butterfish	2,500	75						
Carp					3,000	90		
Catfish and bullheads							4,500	190
Croaker	915,000	9,150						
Eels					2,500	250		
Flounders	59,000	1,770					8,000	400
Harvestfish or "starfish"	165,000	2,500						
Mullet	150,000	6,000					325,000	6,500
Sea bass							20,000	700
Shad	7,700	1,195	1,000	$150			81,000	12,150
Spanish mackerel	3,500	175					2,000	80
Spot	187,000	1,870					130,000	2,600
Squeteagues or "sea trout":								
Gray	962,000	23,060						
Spotted	17,600	830					4,000	240
Striped bass			2,500	250	20,000	2,000		
Sturgeon							600	60
White perch					200,000	11,000		
Crabs, hard	135,000	2,025						
Clams, hard, public							52,000	6,500
Oysters:								
Market, public, spring	37,500	1,450						
Market, public, fall	25,000	1,100						
Total	2,972,300	60,365	3,500	400	1,100,500	17,715	628,100	29,470

Fisheries of North Carolina, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Onslow		Pamlico		Pasquotank		Pender	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	--------	--------	11,000	$110	12,000	$120	--------	--------
Bluefish	--------	--------	8,500	315	--------	--------	--------	--------
Butterfish	--------	--------	10,000	150	--------	--------	--------	--------
Carp	--------	--------	--------	--------	1,800	18	--------	--------
Catfish and bullheads	--------	--------	--------	--------	33,000	660	--------	--------
Croaker	80,000	$800	860,000	8,600	--------	--------	--------	--------
Drum, red or redfish	--------	--------	30,900	633	--------	--------	--------	--------
Eels	--------	--------	900	54	1,000	50	--------	--------
Flounders	14,000	370	99,000	1,740	600	18	5,000	$150
Gizzard shad	--------	--------	--------	--------	3,500	35	--------	--------
Harvestfish or "starfish"	--------	--------	290,000	4,350	--------	--------	--------	--------
Hickory shad	--------	--------	7,500	375	7,000	350	--------	--------
King whiting or "kingfish"	106,000	2,570	--------	--------	--------	--------	--------	--------
Mullet	360,000	10,800	100,800	3,024	2,000	60	450,000	13,500
Pike or pickerel	--------	--------	--------	--------	400	18	--------	--------
Sea bass	25,000	1,050	400	20	--------	--------	--------	--------
Shad	--------	--------	74,600	11,190	31,500	4,725	--------	--------
Spanish mackerel	--------	--------	400	20	--------	--------	--------	--------
Spot	230,000	3,450	89,000	2,835	--------	--------	300,000	4,500
Squeteagues or "sea trout":								
Gray	28,000	860	890,000	17,850	--------	--------	--------	--------
Spotted	10,000	700	112,000	5,840	--------	--------	--------	--------
Striped bass	--------	--------	--------	--------	5,000	500	--------	--------
White perch	--------	--------	--------	--------	4,500	135	--------	--------
Yellow perch	--------	--------	--------	--------	1,500	45	--------	--------
Crabs, hard	262,500	3,938	1,000,000	15,000	--------	--------	--------	--------
Shrimp	--------	--------	50,000	1,500	--------	--------	--------	--------
Clams, hard, public	12,000	1,200	--------	--------	--------	--------	12,000	1,500
Oysters:								
Market, public, spring	24,000	1,000	181,900	7,058	14,500	580	6,000	250
Market, public, fall	17,700	975	259,200	12,150	27,600	1,280	--------	--------
Market, private, spring	17,500	1,250	--------	--------	--------	--------	--------	--------
Total	1,186,700	28,963	4,076,100	92,814	145,900	8,594	773,000	19,900

Species	Perquimans		Tyrrell		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	20,000	$1,000	1,280,000	$9,050	1,433,000	$14,330
Carp	--------	--------	--------	--------	4,500	135
Catfish and bullheads	--------	--------	17,000	440	2,000	100
Gizzard shad	7,000	70	--------	--------	--------	--------
Hickory shad	6,500	325	2,000	100	36,000	1,830
Shad	50,000	7,500	50,000	7,500	65,200	9,850
Striped bass	12,000	1,200	37,000	3,700	47,000	4,700
White perch	10,000	300	23,000	660	104,000	3,500
Yellow perch	--------	--------	5,000	100	--------	--------
Total	105,500	10,395	1,414,000	21,550	1,691,700	34,445

SEED OYSTER FISHERY: BY GEAR

Item	Oyster dredges	
OPERATING UNITS		
	Number	
Fishermen, on boats and shore—regular	12	
Boats, sail	6	
Apparatus, number	12	
Yards at mouth	12	
CATCH		
	Bushels	*Value*
Oysters, seed, public, spring	17,450	$2,617

NOTE.—Of the persons and gear employed in the seed oyster fishery all are duplicated among those in the market oyster fishery or fisheries for other species. The seed oyster fishery in North Carolina is confined to Hyde County.

SOUTH CAROLINA

Fisheries of South Carolina, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Lines		Otter trawls, shrimp
		Anchor	Drift	Runaround	Hand	Trot with baits or snoods	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					10		10
On boats and shore:							
Regular	10	32	63	10	120	6	82
Casual	178	129	507	12	45		
Total	188	161	570	22	175	6	92
Vessels, motor					2		3
Net tonnage					20		47
Boats:							
Motor		20	15	2	12		41
Other	31	99	265	8	58	6	
Apparatus:							
Number	27	190	285	16	175	6	50
Length, yards	3, 880						
Square yards		129, 296	217, 120	4, 050			
Yards at mouth							1, 009
Hooks, baits, or snoods					495	4, 500	

Item	Spears	Tongs, oyster	Rakes, clam	Grabs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						20
On boats and shore:						
Regular	10			269		596
Casual	10	11	2	48	55	877
Total	20	11	2	317	55	1, 493
Vessels, motor						5
Net tonnage						67
Boats:						
Motor				6		94
Other	20	11	2	297	38	762
Apparatus, number	20	11	2	317		

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum, red or redfish	3, 500	$105						
Flounders	9, 500	455						
Hickory shad			1, 500	$150	3, 000	$300		
King whiting or "kingfish"	6, 500	195					2, 000	$60
Mullet	600, 000	16, 500					100, 000	2, 500
Sea bass	25, 000	1, 250						
Shad			98, 600	14, 790	110, 000	16, 500		
Spot	8, 500	255					2, 000	60
Squeteagues or "sea trout":								
Gray	1, 000	70						
Spotted	2, 500	175						
Sturgeon			50, 000	3, 500				
Terrapin, diamond back	3, 000	300						
Total	659, 500	19, 305	150, 100	18, 440	113, 000	16, 800	104, 000	2, 620

Fisheries of South Carolina, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines				Otter trawls, shrimp		Spears	
	Hand		Trot with baits or snoods					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	3,000	$180						
Flounders	8,500	375					13,500	$945
Grunts	9,100	273						
King whiting or "kingfish"	5,500	165						
Sea bass	71,200	3,110			10,000	$200		
Sharks	12,000	120						
Squeteagues or "sea trout":								
Gray	1,000	60						
Spotted	11,000	770						
Crabs, hard			8,000	$160				
Shrimp					1,801,400	54,042		
Octopus	1,500	90						
Total	122,800	5,143	8,000	160	1,811,400	54,242	13,500	945

Species	Tongs		Rakes		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard			600	$75			46,400	$5,787
Oysters:								
Market, public, spring					1,328,300	$41,307	800	40
Market, public, fall					470,600	17,639	900	45
Market, private, spring	17,400	$870			594,800	20,099	2,400	1,200
Market, private, fall	21,000	1,050			422,700	18,024	3,000	1,500
Total	38,400	1,920	600	75	2,816,400	97,069	53,500	8,572

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Charleston	Colleton	Georgetown	Horry	Jasper
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		20				
On boats and shore:						
Regular	243	222		121	10	
Casual	215	205	145	90	196	26
Total	458	447	145	211	206	26
Vessels, motor		5				
Net tonnage		67				
Boats:						
Motor	48	18	7	21		
Other	266	239	73	92	66	26
Apparatus:						
Haul seines	8	2		3	14	
Length, yards	680	100		600	2,500	
Gill nets:						
Anchor	40	32	38	80		
Square yards	9,200	7,320	8,776	104,000		
Drift	77	64	60	59	25	
Square yards	56,900	44,800	41,120	59,000	15,300	
Runaround				10	6	
Square yards				2,500	1,550	
Lines:						
Hand	25	130			20	
Hooks	25	430			40	
Trot with baits or snoods		6				
Baits or snoods		4,500				
Otter trawls, shrimp	32	15		3		
Yards at mouth	640	309		60		
Spears				10	10	
Tongs, oyster		11				
Rakes, clam	2					
Grabs	183	108				26

Fisheries of South Carolina, 1934—Continued

CATCH: BY COUNTIES

Species	Beaufort		Charleston		Colleton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	-------	-------	3,000	$180	-------	-------
Flounders	14,000	$560	1,000	60	-------	-------
Grunts	-------	-------	9,100	273	-------	-------
King whiting or "kingfish"	-------	-------	4,000	120	-------	-------
Sea bass	50,000	2,500	45,000	1,800	-------	-------
Shad	22,500	3,375	38,400	5,760	39,200	$5,880
Sharks	-------	-------	12,000	120	-------	-------
Squeteagues or "sea trout":						
Gray	-------	-------	1,000	60	-------	-------
Spotted	-------	-------	8,000	560	-------	-------
Sturgeon	-------	-------	-------	-------	8,300	581
Crabs, hard	-------	-------	8,000	160	-------	-------
Shrimp	1,427,600	42,828	283,600	8,508	-------	-------
Clams, hard	600	75	-------	-------	-------	-------
Octopus	-------	-------	1,500	90	-------	-------
Oysters:						
Market, public, spring	950,500	29,974	377,800	11,333	-------	-------
Market, public, fall	296,000	11,102	174,600	6,537	-------	-------
Market, private, spring	72,200	4,691	510,000	15,858	-------	-------
Market, private, fall	118,100	7,253	280,000	10,891	-------	-------
Terrapin, diamond back	2,000	150	1,000	150	-------	-------
Total	2,953,500	102,508	1,758,000	62,460	47,500	6,461

Species	Georgetown		Horry		Jasper	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum, red or redfish	-------	-------	3,500	$105	-------	-------
Flounders	6,000	$420	10,500	735	-------	-------
Hickory shad	3,300	330	1,200	120	-------	-------
King whiting or "kingfish"	2,000	60	8,000	240	-------	-------
Mullet	200,000	4,000	500,000	15,000	-------	-------
Sea bass	10,000	200	1,200	60	-------	-------
Shad	103,200	15,480	5,300	795	-------	-------
Spot	6,000	180	4,500	135	-------	-------
Squeteagues or "sea trout":						
Gray	-------	-------	1,000	70	-------	-------
Spotted	-------	-------	5,500	385	-------	-------
Sturgeon	41,700	2,919	-------	-------	-------	-------
Shrimp	90,200	2,706	-------	-------	-------	-------
Clams, hard	9,600	1,194	36,800	4,593	-------	-------
Oysters:						
Market, public, spring	800	40	-------	-------	-------	-------
Market, public, fall	900	45	-------	-------	-------	-------
Market, private, spring	-------	-------	-------	-------	32,400	$1,620
Market, private, fall	-------	-------	-------	-------	48,600	2,430
Total	473,700	27,574	577,500	22,238	81,000	4,050

GEORGIA

Fisheries of Georgia, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets				Lines		
			Anchor	Drift	Run-around	Stake	Hand	Trot with baits or snoods	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	50	-------	-------	-------	-------	-------	-------	-------	-------
On boats and shore:									
Regular	-------	-------	-------	-------	20	-------	3	32	-------
Casual	-------	18	50	330	-------	10	36	-------	40
Total	50	18	50	330	20	10	39	32	40
Vessels, motor	2	-------	-------	-------	-------	-------	-------	-------	-------
Net tonnage	108	-------	-------	-------	-------	-------	-------	-------	-------
Boats.									
Motor	-------	-------	-------	3	10	-------	1	-------	-------
Other	-------	9	47	165	10	5	16	32	40
Accessory boats	6	-------	-------	-------	-------	-------	-------	-------	-------
Apparatus:									
Number	2	8	47	165	12	5	39	32	40
Length, yards	600	800	-------	-------	-------	-------	-------	-------	-------
Square yards	-------	-------	11,375	103,540	3,570	1,800	-------	-------	-------
Hooks, baits, or snoods	-------	-------	-------	-------	-------	-------	39	10,080	2,840

Fisheries of Georgia, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Cast nets	Otter trawls, shrimp	Pots		Dredges, oyster	Tongs, oyster	Grabs	By hand, oysters	Total, exclusive of duplication
			Crab	Fish					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels		89							139
On boats and shore:									
Regular		210	18		6	90	20	26	381
Casual	10			20					468
Total	10	299	18	20	6	90	20	26	988
Vessels, motor		44							46
Net tonnage		313							421
Boats:									
Motor		105			3				122
Other	4		18	10		90	20	26	423
Accessory boats									6
Apparatus:									
Number	10	149	48	50	3	90	20		
Yards at mouth		3, 248			3				

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hickory shad					500	$90	10, 000	$952
Menhaden	18, 751, 500	$63, 859						
Shad					28, 500	5, 130	187, 500	31, 030
Squeteagues or "sea trout", spotted					10, 000	800		
Sturgeon							11, 600	928
Terrapin, diamond back			11, 900	$1, 280				
Total	18, 751, 500	63, 859	11, 900	1, 280	39, 000	6, 020	209, 100	32, 910

Species	Gill nets—Continued				Lines			
	Runaround		Stake		Hand		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker	7, 000	$280						
Drum, red or redfish	2, 500	125						
Flounders	3, 300	96						
King whiting or "kingfish"	10, 000	320			2, 000	$60		
Mullet	49, 000	2, 200						
Sea bass	3, 000	90			20, 000	600		
Shad			16, 000	$2, 240				
Spot	13, 000	460						
Squeteagues or "sea trout", spotted	32, 000	2, 560			6, 000	480		
Crabs, hard							355, 500	$5, 332
Total	119, 800	6, 131	16, 000	2, 240	28, 000	1, 140	355, 500	5, 332

Species	Lines—Con.		Cast nets		Otter trawls, shrimp		Pots	
	Trot with hooks						Crab	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	15, 000	$900						
Mullet			10, 000	$400				
Squeteagues or "sea trout", spotted			8, 000	640				
Crabs, hard							128, 000	$1, 920
Shrimp					6, 842, 900	$203, 127		
Total	15, 000	900	18, 000	1, 040	6, 842, 900	203, 127	128, 000	1, 920

Fisheries of Georgia, 1934—Continued

CATCH: BY GEAR—Continued

Species	Pots—Contd.		Dredges		Tongs		Grabs		By hand	
	Fish									
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	37, 500	$2, 250	--------	-------	--------	-------	--------	-------	--------	-------
Oysters:										
Market, private, spring	--------	-------	33, 500	$2, 606	116, 100	$7, 661	143, 800	$4, 424	34, 200	$1, 897
Market, private, fall	--------	-------	25, 300	1, 975	202, 100	12, 084	--------	-------	13, 700	714
Total	37, 500	2, 250	58, 800	4, 581	318, 200	19, 745	143, 800	4, 424	47, 900	2, 611

OPERATING UNITS: BY COUNTIES

Item	Bryan	Bulloch	Camden	Charlton	Chatham	Glynn	Liberty	McIntosh	Screven	Tattnall	Wayne
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	-------	------	60	-------	21	56	------	2	------	------	-------
On boats and shore:											
Regular	-------	------	34	-------	136	116	12	83	------	------	-------
Casual	76	12	28	10	156	82	------	36	4	24	40
Total	76	12	122	10	313	254	12	121	4	24	40
Vessels, motor	-------	------	7	-------	10	28	------	1	------	------	-------
Net tonnage	-------	------	154	-------	79	180	------	8	------	------	-------
Boats:											
Motor	-------	------	17	-------	22	50	1	32	------	------	-------
Other	38	6	14	5	208	63	10	43	4	12	20
Accessory boats	-------	------	6	-------	------	-------	------	-------	------	------	-------
Apparatus:											
Purse seines, menhaden	-------	------	2	-------	------	-------	------	-------	------	------	-------
Length, yards	-------	------	600	-------	------	-------	------	-------	------	------	-------
Haul seines	-------	------	-------	-------	2	6	------	-------	------	------	-------
Length, yards	-------	------	-------	-------	140	660	------	-------	------	------	-------
Gill nets:											
Anchor	-------	------	-------	-------	40	3	------	-------	4	------	-------
Square yards	-------	------	-------	-------	10, 000	375	------	-------	1, 000	------	-------
Drift	38	6	9	5	35	22	------	18	------	12	20
Square yards	34, 700	3, 360	3, 600	2, 000	28, 000	9, 760	------	14, 440	------	2, 880	4, 800
Runaround	-------	------	-------	-------	4	8	------	-------	------	------	-------
Square yards	-------	------	-------	-------	800	2, 770	------	-------	------	------	-------
Stake	-------	------	5	-------	------	-------	------	-------	------	------	-------
Square yards	-------	------	1, 800	-------	------	-------	------	-------	------	------	-------
Lines:											
Hand	-------	------	-------	-------	3	36	------	-------	------	------	-------
Hooks	-------	------	-------	-------	3	36	------	-------	------	------	-------
Trot with baits or snoods	-------	------	-------	-------	24	8	------	-------	------	------	-------
Baits or snoods	-------	------	-------	-------	7, 200	2, 880	------	-------	------	------	-------
Trot with hooks	-------	------	-------	-------	40	-------	------	-------	------	------	-------
Hooks	-------	------	-------	-------	2, 840	-------	------	-------	------	------	-------
Cast nets	-------	------	-------	-------	10	-------	------	-------	------	------	-------
Otter trawls, shrimp	-------	------	22	-------	27	70	------	30	------	------	-------
Yards at mouth	-------	------	462	-------	570	1, 613	------	603	------	------	-------
Pots:											
Crab	-------	------	-------	-------	12	36	------	-------	------	------	-------
Fish	-------	------	-------	-------	------	-------	------	50	------	------	-------
Dredges, oyster	-------	------	-------	-------	------	2	1	-------	------	------	-------
Yards at mouth	-------	------	-------	-------	------	2	1	-------	------	------	-------
Tongs, oyster	-------	------	-------	-------	71	4	10	5	------	------	-------
Grabs	-------	------	-------	-------	------	-------	------	20	------	------	-------

Fisheries of Georgia, 1934—Continued

CATCH: BY COUNTIES

Species	Bryan		Bullock		Camden		Charlton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hickory shad	1,000	$100						
Menhaden					18,751,500	$63,859		
Shad	29,000	5,220	2,500	$270	50,000	7,000	25,000	$3,500
Shrimp					1,044,000	31,320		
Total	30,000	5,320	2,500	270	19,845,500	102,179	25,000	3,500

Species	Chatham		Glynn		Liberty	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	15,000	$900				
Croaker			7,000	$280		
Drum, red or redfish			2,500	125		
Flounders	300	6	3,000	90		
Hickory shad			2,500	450		
King whiting or "kingfish"	2,000	80	10,000	300		
Mullet	35,000	1,400	24,000	1,200		
Sea bass	23,000	690				
Shad	66,000	11,880	21,000	3,600		
Spot	4,000	100	9,000	360		
Squeteagues or "sea trout", spotted	38,000	3,040	18,000	1,440		
Sturgeon	1,000	80				
Crabs, hard	274,500	4,117	209,000	3,135		
Shrimp	2,175,200	63,096	2,030,200	60,906		
Oysters:						
Market, private, spring	111,600	6,606	27,500	2,146	34,800	$2,704
Market, private, fall	187,400	10,591	15,300	1,190	38,400	2,992
Terrapin, diamond back	2,700	360	9,200	920		
Total	2,935,700	102,946	2,388,200	76,142	73,200	5,696

Species	McIntosh		Screven		Tattnall		Wayne	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	37,500	$2,250						
Hickory shad	2,000	200			1,000	$180	4,000	$112
Shad	17,000	3,060	1,500	$270	7,000	1,260	13,000	2,340
Sturgeon	10,600	848						
Shrimp	1,593,500	47,805						
Oysters, market, private, spring	153,700	5,132						
Total	1,814,300	59,295	1,500	270	8,000	1,440	17,000	2,452

FLORIDA

Fisheries of Florida, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets				Trammel nets
	Menhaden	Other	Common	Long	Anchor	Drift	Run-around	Stake	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	120	9							
On boats and shore:									
Regular			479	201	8	101	2,367		311
Casual			112	6	12	61	248	12	4
Total	120	9	591	207	20	162	2,615	12	315
Vessels, motor	5	1							
Net tonnage	293	11							
Boats:									
Motor			99	72	9	55	1,115		117
Other			67	108	6	61	1,780	6	138
Accessory boats	9	2							
Apparatus:									
Number	5	1	116	75	26	105	2,259	6	181
Length, yards	1,475	350	39,455	50,300					
Square yards					38,600	185,790	1,820,749	2,340	129,839

Fisheries of Florida, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines				Pound nets	Stop nets	Dip nets		Cast nets
	Hand	Troll	Trot with baits or snoods	Trot with hooks			Common	Drop	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	422								
On boats and shore:									
Regular	641	792	42	93	20	62	44	12	12
Casual	486	188		5			13	12	6
Total	1, 549	980	42	98	20	62	57	24	18
Vessels, motor	56								
Net tonnage	1, 911								
Boats:									
Motor	319	480	19	26	9	16	31	6	3
Other	437	30	23	69	7	36	35		3
Accessory boats	7								
Apparatus:									
Number	1, 549	1, 029	30	106	17	9	57	24	18
Square yards						15, 670			
Hooks, baits, or snoods	2, 155	1, 137	6, 740	42, 360					

Item	Otter trawls		Pots				Spears	Dredges		
	Fish	Shrimp	Crab	Eel	Fish	Sea crawfish		Clam	Oyster	Scallop
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	8	308							10	14
On boats and shore:										
Regular		248	25	2	62	56	5	12		4
Casual			5		9		26			
Total	8	556	30	2	71	56	31	12	10	18
Vessels, motor	2	140							4	2
Net tonnage	33	1, 124							33	37
Boats:										
Motor		124	18	2	21	28				4
Other			14		45	10				
Apparatus:										
Number	2	264	1, 648	40	3, 020	958	31	1	4	6
Yards at mouth	63	5, 324							4	11

Item	Tongs, oyster	Rakes, other than for oysters	Forks	Grabs	Coquina scoops	Hooks, sponge	Diving outfits	By hand		Total, exclusive of duplication
								Oysters	Other	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels							8			870
On boats and shore:										
Regular	341		24	28		482	393	63	3	5, 461
Casual	50	2	28		2				163	1, 177
Total	391	2	52	28	2	482	401	63	166	7, 508
Vessels, motor							1			202
Net tonnage							5			3, 316
Boats:										
Motor	119			14			52			2, 064
Other	140	2	10	7		241		34		2, 966
Accessory boats										18
Apparatus, number	391	2	52	28	1	241	53			

Fisheries of Florida, 1934—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							206, 000	$1, 030
Black bass					11, 300	$904	239, 800	14, 108
Bluefish					214, 100	6, 471	6, 600	330
Blue runner or hardtail					17, 900	225		
Cabio or crab eater					100	2		
Catfish and bullheads					739, 000	25, 886	1, 362, 000	42, 052
Cigarfish					4, 500	90		
Crappie					37, 000	1, 260	285, 100	7, 819
Crevalle					11, 100	167	27, 400	274
Croaker					6, 900	179	23, 000	460
Drum:								
Black					40, 000	953	15, 000	300
Red or redfish					93, 600	2, 361	3, 300	131
Flounders					12, 000	525		
Groupers							24, 000	720
Hickory shad							39, 300	244
Kingfish or "king mackerel"			60, 000	$2, 400	1, 300	52		
King whiting or "kingfish"					52, 200	1, 393		
Menhaden	38, 966, 400	$121, 358			17, 000	285		
Mojarro					1, 500	30		
Mullet			200, 000	4, 000	2, 948, 800	78, 384	591, 400	9, 046
Muttonfish							53, 000	1, 160
Permit					1, 300	26		
Pigfish					8, 200	167	28, 000	560
Pompano					31, 600	5, 025	54, 000	6, 600
Shad					244, 800	15, 816	295, 500	20, 622
Sheepshead					27, 900	564	28, 000	560
Snapper, mangrove					23, 900	711	53, 700	1, 611
Snook or sergeantfish					37, 100	770	46, 900	1, 407
Spanish mackerel					533, 600	19, 644	400	20
Spot					6, 900	198	23, 000	460
Squeteagues or "sea trout":								
Spotted					209, 800	11, 193	16, 600	996
White					10, 100	185		
Sunfish					25, 000	840	407, 000	10, 773
Tenpounder					27, 500	482		
White perch					18, 200	728		
Turtles:								
Green					400	4		
Soft shell							55, 000	674
Total	38, 966, 400	121, 358	260, 000	6, 400	5, 414, 600	175, 520	3, 884, 000	121, 957

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			9, 000	$540	1, 231, 100	$65, 906		
Blue runner or hardtail			1, 200	24	156, 300	2, 701		
Catfish and bullheads					8, 200	258		
Crevalle					72, 200	1, 120		
Croaker					8, 000	160		
Drum:								
Black					39, 800	792		
Red or redfish					696, 800	16, 462		
Flounders					23, 200	756		
Groupers					53, 000	1, 510		
Hickory shad			3, 600	108				
Kingfish or "king mackerel"					2, 000	160		
King whiting or "kingfish"			4, 800	159	77, 600	1, 792		
Mojarro					3, 300	75		
Mullet					19, 176, 700	520, 318		
Muttonfish					56, 000	1, 960		
Pigfish					53, 400	992		
Pinfish or sailors choice					31, 000	620		
Pompano					170, 600	30, 879		
Sawfish					17, 500	35		
Sea bass					7, 000	260		
Sea catfish					105, 000	210		
Shad	20, 000	$2, 500	214, 900	26, 788			7, 000	$1, 260
Sharks	3, 200, 000	8, 500			17, 500	35		
Sheepshead					413, 600	9, 156		

Fisheries of Florida, 1934—Continued

CATCH: BY GEAR—Continued

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Skates					175,000	$350		
Snapper:								
Mangrove					74,300	2,137		
Red					69,200	4,116		
Snook or sergeantfish					228,900	4,674		
Spanish mackerel			81,300	$3,252	5,927,200	238,964		
Spot					54,500	1,015		
Squeteagues or "sea trout":								
Spotted			8,100	486	2,112,900	111,682		
White					300	9		
Sturgeon			1,000	60				
Turtles, green	3,000	$180						
Total	3,223,000	11,180	323,900	31,417	31,062,100	1,019,104	7,000	$1,260

Species	Trammel nets		Lines					
			Hand		Troll		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack			2,500	$55	1,500	$25		
Black bass			26,800	1,608				
Bluefish			156,600	11,058	303,500	15,590		
Blue runner or hardtail			700	24				
Cabio or crab eater			6,800	164				
Croaker					500	15		
Dolphin					8,000	240		
Drum:								
Black			5,200	118				
Red or redfish	26,400	$717	169,300	4,087				
Flounders	300	11						
Groupers			3,245,600	76,344				
Grunts			20,300	538				
Hogfish			4,000	120				
Jewfish			12,400	388				
Kingfish or "king mackerel"					2,574,500	113,473		
Mackerel			200	9				
Mullet	588,200	16,709						
Muttonfish			77,900	4,999				
Pompano	172,900	33,635	4,200	1,155				
Porgies			28,300	630				
Sea bass			44,000	1,722	1,000	40		
Sheepshead	7,500	199	115,400	2,534				
Snapper:								
Mangrove	300	9	64,900	2,031				
Red			3,987,600	219,275				
Snook or sergeantfish			91,800	2,529				
Spanish mackerel			10,000	440	149,400	8,175		
Squeteagues or "sea trout":								
Spotted	158,200	8,190	521,200	27,850				
White	1,100	30	2,500	63				
Tripletail			600	12				
Tuna or "horse mackerel"			1,300	41	3,000	120		
Wahoo					2,000	60		
Yellowtail			81,400	4,677				
Crabs, hard							91,900	$2,075
Total	954,900	59,500	8,681,500	362,471	3,043,400	137,738	91,900	2,076

Fisheries of Florida, 1934—Continued

CATCH: By gear—Continued

Species	Lines—Con.		Pound nets		Stop nets		Dip nets	
	Trot with hooks						Common	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			8, 900	$25				
Bluefish			12, 000	720	1, 000	$60		
Blue runner or hardtail			5, 000	100				
Cabio or crab eater			500	15				
Catfish and bullheads	354, 300	$10, 476	136, 400	4, 769				
Crevalle					300	4		
Croaker					4, 000	80		
Drum:								
Black					100	2		
Red or redfish			1, 600	49	25, 900	470		
Eels			200	7				
Flounders					6, 400	192		
Groupers			800	16				
Jewfish			1, 000	20				
Kingfish or "king mackerel"			300	12				
King whiting or "kingfish"					4, 000	80		
Mojarro					9, 300	186		
Mullet					428, 200	11, 680		
Permit					400	8		
Pigfish					5, 200	104		
Pompano					4, 200	840		
Porgies			200	4				
Sheepshead			500	15	13, 000	238		
Snapper, mangrove			500	15	2, 100	53		
Snook or sergeantfish					9, 100	166		
Spanish mackerel			32, 300	1, 292				
Spot					700	14		
Squeteagues or "sea trout":								
Spotted			7, 200	390	49, 200	2, 488		
White					300	9		
Sunfish			14, 600	438				
Crabs, king							500, 000	$600
Sea crawfish or "spiny lobster"							131, 100	5, 244
Turtles:								
Green			1, 200	60				
Soft shell			200	3				
Total	354, 300	10, 476	223, 400	7, 950	563, 400	16, 674	631, 100	5, 844

Species	Dip nets—Con.		Cast nets		Otter trawls			
	Drop				Fish		Shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker					10, 000	$300		
Flounders					11, 200	606	2, 500	$50
King whiting or "kingfish"					70, 000	2, 100	116, 000	2, 320
Mojarro			5, 000	$100				
Mullet			33, 000	990				
Porgies					10, 000	300		
Squeteagues or "sea trout", gray					10, 000	500		
Crabs, hard	5, 600	$120						
Sea crawfish or "spiny lobster"	100, 000	4, 000						
Shrimp							16, 292, 200	497, 870
Total	105, 600	4, 120	38, 000	1, 090	111, 200	3, 806	16, 410, 700	500, 240

Fisheries of Florida, 1934—Continued

CATCH: BY GEAR—Continued

Species	Pots							
	Crab		Eel		Fish		Sea crawfish	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass					145,000	$8,575		
Catfish and bullheads					254,300	10,036		
Crappie					140,200	2,877		
Eels			18,200	$546				
Groupers					18,000	900		
Grunts					20,000	600		
Hogfish					2,000	60		
Muttonfish					12,000	720		
Snapper:								
Mangrove					9,000	450		
Red					11,000	880		
Snook or sergeantfish					8,000	400		
Sunfish					70,900	1,493		
Turbot					1,500	45		
Crabs:								
Hard	85,300	$1,279						
Stone	80,600	5,737						
Sea crawfish or "spiny lobster"							89,300	$5,759
Total	165,900	7,016	18,200	546	691,900	27,036	89,300	5,759

Species	Spears		Dredges					
			Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	19,200	$1,002						
Clams, hard, public			399,800	$19,994				
Oysters:								
Market, public, spring					47,600	$1,680		
Market, private, spring					17,200	1,516		
Market, private, fall					6,400	572		
Scallops:								
Bay							16,000	$1,000
Sea							120,200	17,891
Total	19,200	1,002	399,800	19,994	71,200	3,768	136,200	18,891

Species	Tongs		Rakes		Forks		Grabs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sea crawfish or "spiny lobster"							30,900	$2,163
Clams, hard, public			500	$50	134,200	$5,988		
Oysters:								
Market, public, spring	779,800	$38,892						
Market, public, fall	509,700	30,573						
Market, private, spring	73,100	5,444						
Market, private, fall	39,100	3,028						
Total	1,401,700	77,937	500	50	134,200	5,988	30,900	2,163

Species	Coquina scoops		Hooks, sponge		Diving outfits		By hand			
							Oysters		Other	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Coquina	5,800	$975								
Hard, public									500	$50
Conchs			2,500	$75						
Oysters:										
Market, private, spring							271,500	$9,696		
Market, private, fall							291,600	10,230		
Scallops, bay									58,100	5,596
Turtles, soft shell									6,000	120
Sponges:										
Grass			45,400	24,699						
Sheepswool			129,900	190,756	328,600	$529,501				
Velvet			200	110						
Wire			300	88	14,100	7,806				
Yellow			62,100	34,541	74,700	50,149				
Total	5,800	975	240,400	250,269	417,400	587,456	563,100	19,926	64,600	5,766

Fisheries of Florida, 1934—Continued

OPERATING UNITS: BY COUNTIES

Item	Bay	Brevard	Broward	Charlotte	Citrus	Clay	Collier	Dade
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	51	5						14
On boats and shore:								
Regular	194	166	22	137	130	32	234	423
Casual	34	28	57	35	17		22	100
Total	279	199	79	172	147	32	256	537
Vessels, motor	8	1						2
Net tonnage	81	19						26
Boats:								
Motor	40	69	38	55	58	10	81	276
Other	57	94	4	135	122	18	176	82
Accessory boats								2
Apparatus:								
Purse seines:								
Other than menhaden								1
Length, yards								350
Haul seines:								
Common	14			5			5	
Length, yards	5,300			2,240			1,850	
Long						8		
Length, yards						6,200		
Gill nets:								
Anchor		8						
Square yards		8,000						
Runaround	8	85	2	70	104		136	147
Square yards	5,850	73,800	600	78,360	64,500		144,765	35,740
Trammel nets	2			6			20	
Square yards	1,100			4,900			23,100	
Lines:								
Hand	111	52	50	47	25		72	155
Hooks	214	52	50	47	25		72	165
Troll		12	40	16	2		52	250
Hooks		12	40	16	2		52	250
Trot with hooks						16		
Hooks						9,600		
Stop nets				7				
Square yards				11,070				
Dip nets, drop								12
Otter trawls:								
Shrimp		16						1
Yards at mouth		323						23
Pots:								
Crab		483						400
Fish								50
Sea crawfish			350					520
Spears	7							
Dredges, clam							1	
Tongs, oyster	58				20			
Forks							18	
Grabs								28

Item	Duval	Escambia	Franklin	Glades	Gulf	Hernando	Hillsborough	Indian River
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	12	236	42		56		44	
On boats and shore:								
Regular	142	107	411	46	20	8	95	51
Casual	48	16	22		5		28	26
Total	202	359	475	46	81	8	167	77
Vessels, motor	6	27	12		2		7	
Net tonnage	40	1,561	83		93		96	
Boats:								
Motor	68	35	181	22	6	2	33	26
Other	68	14	85	28	5	8	99	50
Apparatus:								
Purse seines, menhaden					2			
Length, yards					560			
Haul seines:								
Common	6	6	5		2			
Length, yards	6,000	2,100	2,050		800			
Long				10				
Length, yards				8,800				

Fisheries of Florida, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Duval	Escambia	Franklin	Glades	Gulf	Hernando	Hillsborough	Indian River
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Apparatus—Continued.								
Gill nets:								
Anchor	6							
Square yards	21,000							
Drift	42		2					
Square yards	84,000		950					
Runaround	4	12	35		5	8	77	77
Square yards	5,330	72,350	21,800		10,350	5,230	56,535	49,600
Trammel nets		14					5	
Square yards		7,100					4,150	
Lines:								
Hand	32	276	40		5		79	20
Hooks	64	552	74		5		127	20
Troll	5							
Hooks	5							
Trot with baits or snoods	12		14					
Baits or snoods	1,800		3,950					
Trot with hooks	40		7					
Hooks	12,000		360					
Dip nets:								
Common							4	
Drop		12						
Cast nets							12	
Otter trawls:								
Shrimp	18		64					
Yards at mouth	380		768					
Pots, fish			195	1,200				
Spears			11					
Dredges:								
Oyster			4					
Yards at mouth			4					
Scallop					4			
Yards at mouth					5			
Tongs, oyster			212				2	

Item	Jefferson	Lee	Levy	Manatee	Martin	Monroe	Nassau	Okaloosa
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels							129	
On boats and shore:								
Regular	10	307	114	88	96	420	99	115
Casual	7	59	23	21	26	15	35	
Total	17	366	137	109	122	435	263	115
Vessels, motor							33	
Net tonnage							439	
Boats:								
Motor	3	165	48	39	39	89	30	22
Other	17	328	126	104	30	172	46	20
Accessory boats							9	
Apparatus:								
Purse seines:								
Menhaden							3	
Length, yards							915	
Haul seines:								
Common		4		12			3	8
Length, yards		1,325		2,940			300	3,200
Long					10			
Length, yards					9,600			
Gill nets:								
Anchor						12		
Square yards						9,600		
Drift				5			13	
Square yards				2,000			5,840	
Runaround	10	264	94	76	30	44	4	10
Square yards	5,800	206,175	49,100	69,830	36,000	135,240	1,014	5,430
Stake							6	
Square yards							2,340	
Trammel nets		11	38	5				10
Square yards		23,300	20,800	4,235				5,240
Lines:								
Hand	17	124	28	16		38	20	22
Hooks	17	124	28	16		38	40	44
Troll		20	52	6	30	86		
Hooks		20	52	6	60	86		
Trot with baits or snoods		2						
Baits or snoods		490						

Fisheries of Florida, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Jefferson	Lee	Levy	Manatee	Martin	Monroe	Nassau	Okaloosa
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Apparatus—Continued.								
Pound nets			3					
Dip nets, common						53		
Otter trawls:								
Fish							1	
Yards at mouth							33	
Shrimp							50	
Yards at mouth							1, 110	
Pots:								
Crab				75		175		
Sea crawfish						88		
Spears								4
Tongs, oyster			14					
Forks				2				
Coquina scoops		1						
Hooks, sponge						122		

Item	Okeechobee	Palm Beach	Pasco	Pinellas	Putnam	St. Johns	St. Lucie
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels				54		215	
On boats and shore:							
Regular	34	240	24	820	164	66	136
Casual		86		162		30	36
Total	34	326	24	1, 036	164	311	172
Vessels, motor				7		92	
Net tonnage				97		739	
Boats:							
Motor	14	129	12	163	64	20	68
Other	19	69	24	278	93	32	40
Accessory boats						7	
Apparatus:							
Haul seines:							
Common				9			
Length, yards				3, 650			
Long	4				40		
Length, yards	3, 600				19, 700		
Gill nets:							
Drift				14	29		
Square yards				35, 000	58, 000		
Runaround		270	24	194		3	117
Square yards		68, 400	15, 100	282, 680		1, 500	92, 875
Trammel nets				4	4		
Square yards				2, 400	1, 064		
Lines:							
Hand		20		112	50	34	
Hooks		20		173	50	34	
Troll		192		54			126
Hooks		264		60			126
Trot with hooks	18				25		
Hooks	9, 000				11, 400		
Pound nets					14		
Stop nets				2			
Square yards				4, 600			
Cast nets		6					
Otter trawls:							
Fish						1	
Yards at mouth						30	
Shrimp						108	
Yards at mouth						2, 565	
Pots:							
Crab				515			
Eel					40		
Fish	1, 560				15		
Dredges, scallop						2	
Yards at mouth						6	
Tongs, oyster				8			
Forks				12		20	
Hooks, sponge				70			
Diving outfits				53			

Fisheries of Florida, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Santa Rosa	Sarasota	Seminole	Taylor	Volusia	Wakulla	Walton
Fisherman:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					12		
On boats and shore:							
Regular	9	108	47	136	101	101	8
Casual	8	24		45	25	137	
Total	17	132	47	181	138	238	8
Vessels, motor					5		
Net tonnage					42		
Boats:							
Motor	4	53	6	15	35	44	2
Other	4	122	27	121	74	171	4
Apparatus:							
Haul seines:							
Common		1	22		3	11	
Length, yards		250	3, 700		450	3, 300	
Long					3		
Length, yards					2, 400		
Gill nets:							
Runaround		106		40	40	163	
Square yards		101, 785		19, 600	32, 000	73, 410	
Trammel nets	4	4				50	4
Square yards	1, 750	12, 000				17, 500	1, 200
Lines:							
Hand		19		61	24		
Hooks		19		61	24		
Troll		84		2			
Hooks		84		2			
Trot with baits or snoods					2		
Baits or snoods					500		
Otter trawls, shrimp					7		
Yards at mouth					155		
Spears	9						
Tongs, oyster	8	6			51	10	2
Rakes, other than for oysters					2		
Hooks, sponge				49			

CATCH: BY COUNTIES

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	169, 800	$5, 129	75, 000	$3, 100	10, 000	$800	19, 900	$1, 194
Blue runner or hardtail	3, 500	70	300	12			10, 600	212
Cabio or crab eater							700	21
Cigarfish	4, 500	90						
Crevalle							1, 200	18
Croaker					500	15	6, 000	120
Drum:								
Black			13, 000	260			800	14
Red or redfish	17, 700	480	25, 200	707			74, 000	1, 344
Flounders	2, 500	105					12, 200	366
Groupers	601, 300	15, 131	400	8	5, 200	520	7, 000	140
Grunts							1, 600	32
Jewfish							1, 500	30
Kingfish or "king mackerel"	1, 000	40			60, 000	2, 400	10, 800	432
King whiting or "kingfish"			30, 000	840			5, 000	100
Menhaden	6, 000	120						
Mojarro							10, 300	206
Mullet	1, 162, 700	29, 362	946, 700	21, 046			1, 404, 600	37, 104
Muttonfish					5, 000	500	3, 000	60
Permit							1, 400	28
Pigfish							9, 000	180
Pinfish or sailors choice			11, 000	220				
Pompano	5, 500	825	8, 900	1, 780	5, 500	1, 525	32, 200	6, 440
Porgies	500	10						
Sharks			200, 000	1, 000				
Sheepshead	5, 600	156	13, 000	260			50, 600	924
Snapper:								
Mangrove							9, 000	242
Red	494, 400	26, 964	500	20	14, 000	1, 400		
Snook or sergeantfish			7, 500	150			31, 400	570
Spanish mackerel	422, 600	15, 170	6, 000	280	12, 000	600	79, 600	3, 184
Spot			13, 000	260			1, 100	22

Fisheries of Florida, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Squeteagues or "sea trout":								
Spotted	86, 600	$4, 015	217, 600	$11, 120	200	$14	224, 700	$11, 382
White							2, 000	60
Tenpounder	10, 000	200						
Tripletail							600	12
Yellowtail							4, 500	90
Crabs, hard			85, 300	1, 279				
Sea crawfish or "spiny lobster"					21, 000	2, 100		
Shrimp			179, 000	8, 810				
Oysters:								
Market, public, spring	93, 000	6, 200						
Market, public, fall	114, 000	7, 600						
Total	3, 201, 200	111, 667	1, 832, 400	51, 152	133, 400	9, 874	2, 015, 300	64, 527

Species	Citrus		Clay		Collier		Dade	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack							500	$15
Black bass			14, 600	$1, 156				
Bluefish	22, 500	$1, 125			7, 700	$308	113, 100	6, 786
Blue runner or hardtail					4, 800	48	10, 000	200
Catfish and bullheads			44, 500	1, 632				
Crappie			300	21				
Crevalle							2, 500	50
Dolphin							8, 000	240
Drum, red or redfish	81, 400	2, 220	2, 800	112	66, 200	1, 554		
Flounders	400	12			1, 700	51		
Groupers	1, 500	45			6, 500	130	99. 000	4, 950
Grunts					1, 300	26	32, 000	960
Hogfish							6, 000	180
Jewfish					3, 200	64	5, 000	200
Kingfish or "king mackerel"	1, 000	40			61, 700	2, 468	801, 100	35, 749
Mojarro					1, 800	45		
Mullet	1, 232, 400	36, 972			2, 548, 600	63, 709	602, 100	16, 064
Muttonfish					900	18	61, 000	4, 150
Pigfish	300	24			7, 200	165		
Pompano	900	180			67, 100	13, 420	10, 000	2, 500
Porgies							1, 500	45
Sea bass							1, 000	40
Shad			200	24				
Sheepshead	48, 400	1, 320			41, 300	895	10, 000	300
Snapper:								
Mangrove	21, 000	630			25, 100	753	11, 500	575
Red							49, 500	3, 560
Snook or sergeantfish					86, 200	1, 960	23, 000	1, 300
Spanish mackerel	5, 000	200			203, 100	10, 155	1, 338, 800	66, 938
Squeteagues or "sea trout", spotted	132, 200	6, 055			104, 300	5, 218	19, 600	1, 372
Sunfish			10, 000	490				
Tuna or "horse mackerel"							3, 000	120
Turbot							1, 500	45
Wahoo							2, 000	60
Yellowtail					4, 100	123	13, 100	1, 179
Crabs, stone							13, 600	2, 992
Sea crawfish or "spiny lobster"							161, 800	8, 326
Shrimp							80, 000	2, 400
Clams, hard, public					496, 600	24, 834		
Oysters:								
Market, public, spring	20, 400	912						
Market, public, fall	36, 400	1, 657						
Total	1, 603, 800	51, 392	72, 400	3, 435	3, 739, 400	125, 944	3, 480, 200	161, 296

Fisheries of Florida, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Duval		Escambia		Franklin		Glades	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass	11,300	$904					243,000	$13,967
Bluefish	3,700	185	30,100	$602	2,600	$118		
Blue runner or hardtail			21,800	218				
Cabio or crab eater			100	2				
Catfish and bullheads	400,000	14,000	4,700	164	57,300	1,774	422,900	9,524
Crappie	30,000	1,050					156,700	3,149
Crevalle			10,200	153				
Croaker					100	3		
Drum.								
Black			5,900	108				
Red or redfish	500	20	27,700	753	29,100	774		
Flounders			300	16	9,500	405		
Groupers	200	8	1,612,000	36,999	328,300	5,988		
Jewfish			600	12				
Kingfish or "king mackerel"			300	12				
King whiting or "kingfish"	66,400	1,391	200	3				
Menhaden					4,000	60		
Mullet	58,700	1,761	242,500	6,062	933,700	28,011		
Pompano	100	15	26,500	3,610	400	80		
Porgies			6,200	139	800	16		
Sea bass	40,000	1,602						
Shad	115,200	14,024						
Sheepshead			5,300	123	1,600	42		
Snapper, red	16,200	647	2,613,300	142,992	222,000	12,108		
Spanish mackerel	27,400	2,295	397,400	13,909	14,100	564		
Squeteagues or "sea trout":								
Spotted	21,700	1,460	33,500	2,440	69,000	3,406		
White			2,300	31				
Sturgeon					1,000	60		
Sunfish	18,000	630					156,700	3,149
Tenpounder					4,000	80		
Crabs, hard	40,500	1,215	5,600	120	26,600	380		
Shrimp	857,700	24,106			1,539,500	46,185		
Oysters:								
Market, public, spring					686,100	31,060		
Market, public, fall					314,100	17,405		
Market, private, spring					17,200	1,516		
Market, private, fall					6,400	572		
Turtles:								
Green			400	4				
Soft shell							4,200	63
Total	1,707,600	65,313	5,046,900	208,472	4,267,400	150,607	983,500	29,852

Species	Gulf		Hernando		Hillsborough		Indian River	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	11,800	$354	4,000	$200	6,000	$360	75,200	$5,326
Crevalle					17,500	35	8,000	160
Drum:								
Black							16,000	320
Red or redfish			14,300	390	106,300	2,898	23,800	476
Flounders	800	24			1,100	33		
Groupers					160,900	2,974	8,000	160
King whiting or "kingfish"							11,000	220
Menhaden	9,562,200	22,001						
Mullet	318,200	9,546	100,000	3,000	775,000	23,250	688,700	16,518
Muttonfish							5,000	100
Pinfish or sailors choice							16,000	320
Pompano	3,800	570			14,000	2,800	18,600	3,390
Porgies					500	10		
Sawfish					17,500	35		
Sea bass							2,000	60
Sea catfish					105,000	210		
Sharks					17,500	35		
Sheepshead			2,500	69	85,400	2,331	21,000	420
Skates					175,000	350		
Snapper:								
Mangrove			2,000	60	8,000	240	5,000	100
Red					221,200	12,294	1,200	36
Snook or sergeantfish					52,800	960	18,000	360
Spanish mackerel	141,000	5,640			1,500	60	1,400	84
Spot							21,000	405
Squeteagues or "sea trout", spotted	14,800	810	11,000	500	170,500	9,100	294,000	17,290
Crabs, king					500,000	600		
Oysters:								
Market, private, spring					200	44		
Market, private, fall					400	88		
Scallops, bay	16,000	1,000						
Total	10,068,600	39,945	133,800	4,219	2,436,300	58,707	1,233,900	45,745

Fisheries of Florida, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Jefferson		Lee		Levy		Manatee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack			1, 500	$25				
Bluefish			34, 700	1, 720	21, 500	$1, 284	14, 500	$870
Blue runner or hardtail			25, 300	500	11, 000	220	2, 500	50
Cabio or crab eater			6, 100	143	500	15		
Catfish and bullheads					1, 000	30		
Croaker							800	16
Drum:								
Black			2, 300	40	300	9	600	12
Red or redfish	9, 300	$255	180, 500	3, 797	32, 200	879	50, 000	1, 003
Flounders			5, 000	150	3, 600	108	1, 400	42
Groupers			12, 500	250	1, 800	36	3, 500	70
Grunts			4, 500	90			200	4
Jewfish			100	2	1, 000	20		
Kingfish or "king mackerel"			9, 200	368	69, 000	2, 760	3, 000	120
Mojarro							2, 000	40
Mullet	140, 000	4, 200	3, 794, 300	98, 452	929, 100	27, 873	1, 100, 400	30, 506
Permit							300	6
Pigfish			15, 500	310			1, 500	30
Pompano			53, 000	10, 610	6, 000	1, 200	10, 400	2, 080
Porgies					1, 500	30	1, 000	20
Sea bass					4, 000	120		
Sheepshead	3, 300	90	128, 000	2, 360	12, 700	351	20, 000	391
Snapper:								
Mangrove			70, 300	2, 109	2, 400	72	4, 000	118
Red					1, 000	60		
Snook or sergeantfish			53, 500	1, 198			33, 000	600
Spanish mackerel			70, 300	2, 957	36, 300	1, 452	51, 500	2, 060
Spot					500	15		
Squeteagues or "sea trout":								
Spotted	37, 500	2, 100	435, 500	21, 918	310, 800	16, 320	83, 100	4, 536
White			300	11			7, 700	140
Yellowtail			7, 000	155				
Crabs:								
Hard			16, 800	240				
Stone							1, 500	125
Clams:								
Coquina			5, 800	975				
Hard, public							200	20
Oysters:								
Market, public, spring					1, 500	85		
Market, public, fall					7, 700	512		
Scallops, bay							4, 000	375
Turtles:								
Green					1, 200	60		
Soft shell			6, 000	120				
Total	190, 100	6, 645	4, 938, 000	148, 500	1, 456, 600	53, 511	1, 397, 100	43, 234

Species	Martin		Monroe		Nassau		Okaloosa	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass	2, 400	$240						
Bluefish	249, 100	14, 880	3, 800	$304	1, 000	$50	52, 000	$1, 040
Blue runner or hardtail			3, 600	36			25, 000	250
Crevalle	37, 400	474						
Croaker	23, 000	460			10, 000	300		
Drum:								
Black	20, 000	400			6, 000	150	1, 100	20
Red or redfish			3, 300	40	4, 500	225	5, 500	150
Flounders					12, 500	550	3, 000	162
Groupers	24, 000	720	32, 000	1, 570			192, 500	4, 375
Grunts			700	26				
Jewfish			2, 000	80				
Kingfish or "king mackerel"	15, 000	600	229, 300	9, 172				
King whiting or "kingfish"					96, 000	2, 620		
Menhaden					29, 404, 200	99, 357	7, 000	105
Mullet	709, 700	11, 295	229, 000	4, 580	8, 000	200	420, 000	11, 550
Muttonfish	59, 000	1, 280	19, 200	951				
Pigfish	33, 000	660						
Pompano	65, 000	8, 800	1, 200	144			5, 000	750
Porgies			400	12	10, 000	300	11, 000	250
Shad					22, 000	3, 960		
Sharks			3, 000, 000	7, 500				
Sheepshead	34, 000	680	3, 400	72			1, 600	43
Snapper:								
Mangrove	53, 700	1, 611	1, 800	72				
Red			4, 000	240			143, 000	7, 800

Fisheries of Florida, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Martin		Monroe		Nassau		Okaloosa	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Snook or sergeantfish	53,900	$1,627	1,500	$15	-------	-------	-------	-------
Spanish mackerel	130,400	3,920	841,100	33,644	-------	-------	400,000	$14,000
Spot	28,000	560	-------	-------	5,000	$100	-------	-------
Squeteagues or "sea trout":								
Gray	-------	-------	-------	-------	10,000	500	-------	-------
Spotted	17,100	1,021	3,500	128	22,000	1,320	18,700	1,360
Tenpounder	-------	-------	-------	-------	-------	-------	3,500	52
Yellowtail	-------	-------	52,700	3,130	-------	-------	-------	-------
Crabs, stone	-------	-------	13,000	520	-------	-------	-------	-------
Sea crawfish or "spiny lobster"	-------	-------	168,500	6,740	-------	-------	-------	-------
Shrimp	-------	-------	-------	-------	3,497,400	103,375	-------	-------
Conchs	-------	-------	2,500	75	-------	-------	-------	-------
Oysters:								
Market, private, spring	-------	-------	-------	-------	168,700	7,403	-------	-------
Market, private, fall	-------	-------	-------	-------	168,700	7,403	-------	-------
Turtles, green	-------	-------	3,000	180	-------	-------	-------	-------
Sponges:								
Grass	-------	-------	15,000	4,681	-------	-------	-------	-------
Sheepswool	-------	-------	47,100	73,783	-------	-------	-------	-------
Velvet	-------	-------	200	110	-------	-------	-------	-------
Wire	-------	-------	300	88	-------	-------	-------	-------
Yellow	-------	-------	24,600	8,840	-------	-------	-------	-------
Total	1,554,700	49,228	4,706,700	156,733	33,446,000	227,813	1,288,900	41,907

Species	Okeechobee		Palm Beach		Pasco		Pinellas	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack	-------	-------	2,000	$40	-------	-------	-------	-------
Black bass	35,000	$1,925	-------	-------	-------	-------	-------	-------
Bluefish	-------	-------	729,000	36,470	3,000	$150	50,400	$3,024
Blue runner or hardtail	-------	-------	50,400	1,012	-------	-------	1,800	36
Catfish and bullheads	329,000	11,636	-------	-------	-------	-------	-------	-------
Crappie	160,200	3,202	-------	-------	-------	-------	-------	-------
Crevalle	-------	-------	30,000	600	-------	-------	500	5
Croaker	-------	-------	7,500	150	-------	-------	-------	-------
Drum:								
Black	-------	-------	-------	-------	-------	-------	100	2
Red or redfish	-------	-------	29,500	590	14,300	390	57,600	1,098
Flounders	-------	-------	-------	-------	-------	-------	2,400	72
Groupers	-------	-------	44,000	1,320	-------	-------	196,300	3,976
Kingfish or "king mackerel"	-------	-------	724,300	32,009	-------	-------	77,800	3,112
King whiting or "kingfish"	-------	-------	5,000	100	-------	-------	-------	-------
Mojarro	-------	-------	5,000	100	-------	-------	-------	-------
Mullet	-------	-------	28,000	815	402,400	12,072	1,531,800	45,954
Muttonfish	-------	-------	42,800	1,720	-------	-------	-------	-------
Pigfish	-------	-------	-------	-------	-------	-------	1,300	29
Pompano	-------	-------	56,900	8,575	500	100	15,300	3,060
Porgies	-------	-------	-------	-------	-------	-------	3,100	62
Sea bass	-------	-------	5,000	200	-------	-------	-------	-------
Sheepshead	-------	-------	41,000	820	4,400	120	27,800	575
Snapper:								
Mangrove	-------	-------	800	40	3,500	105	5,100	153
Red	-------	-------	68,000	4,080	-------	-------	217,300	11,850
Snook or sergeantfish	-------	-------	41,800	852	-------	-------	6,500	120
Spanish mackerel	-------	-------	1,320,300	39,769	15,000	600	581,200	23,248
Squeteagues or "sea trout":								
Spotted	-------	-------	17,200	1,034	11,800	535	230,900	13,080
White	-------	-------	-------	-------	-------	-------	900	24
Sunfish	60,900	1,218	-------	-------	-------	-------	-------	-------
Tenpounder	-------	-------	-------	-------	-------	-------	10,000	150
Crabs, stone	-------	-------	-------	-------	-------	-------	52,500	2,100
Clams, hard, public	-------	-------	-------	-------	-------	-------	4,800	480
Oysters:								
Market, public, spring	-------	-------	-------	-------	-------	-------	4,200	300
Market, public, fall	-------	-------	-------	-------	-------	-------	5,100	360
Scallops, bay	-------	-------	-------	-------	-------	-------	51,700	4,996
Turtles, soft shell	40,600	508	-------	-------	-------	-------	-------	-------
Sponges:								
Grass	-------	-------	-------	-------	-------	-------	29,400	19,503
Sheepswool	-------	-------	-------	-------	-------	-------	366,000	597,574
Wire	-------	-------	-------	-------	-------	-------	14,100	7,806
Yellow	-------	-------	-------	-------	-------	-------	105,500	70,650
Total	625,700	18,489	3,248,500	130,296	454,900	14,072	3,651,400	813,399

Fisheries of Florida, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Putnam		St. Johns		St. Lucie		Santa Rosa		Sarasota	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	214, 900	$1, 055	------	------	------	------	------	------	------	------
Black bass	100, 600	6, 043	------	------	------	------	------	------	------	------
Bluefish	------	------	115, 100	$8, 978	69, 200	$4, 152	------	------	17, 600	$1, 056
Blue runner or hardtail	------	------	------	------	------	------	------	------	7, 500	150
Catfish and bullheads	1, 074, 300	36, 500	------	------	------	------	------	------	------	------
Crappie	89, 600	3, 584	------	------	------	------	------	------	------	------
Crevalle	------	------	------	------	700	10	------	------	------	------
Drum:										
Black	------	------	2, 500	50	1, 500	30	------	------	------	------
Red or redfish	900	35	5, 000	200	------	------	4, 400	$120	46, 600	884
Eels	18, 400	553	------	------	------	------	------	------	------	------
Flounders	------	------	3, 800	236	------	------	8, 100	485	1, 800	54
Groupers	------	------	------	------	3, 000	90	------	------	1, 500	30
Hickory shad	42, 900	352	------	------	------	------	------	------	------	------
Kingfish or "king mackerel"	------	------	2, 000	160	375, 100	18, 755	------	------	197, 000	7, 880
King whiting or "kingfish"	------	------	66, 000	1, 320	------	------	------	------	------	------
Mackerel	------	------	200	9	------	------	------	------	------	------
Mullet	15, 900	477	3, 100	78	426, 600	8, 532	135, 000	4, 050	963, 600	26, 498
Muttonfish	------	------	------	------	3, 000	60	------	------	------	------
Pigfish	------	------	------	------	3, 000	45	------	------	4, 000	80
Pinfish or sailors choice	------	------	3, 000	60	------	------	------	------	------	------
Pompano	------	------	100	15	9, 000	1, 350	------	------	17, 000	3, 400
Porgies	------	------	------	------	------	------	------	------	2, 000	40
Shad	417, 800	35, 298	------	------	------	------	------	------	------	------
Sheepshead	------	------	------	------	3, 000	60	700	18	30, 200	560
Snapper:										
Mangrove	------	------	------	------	------	------	------	------	4, 000	107
Red	------	------	2, 200	220	------	------	------	------	------	------
Snook or sergeantfish	------	------	------	------	1, 500	30	------	------	11, 200	204
Spanish mackerel	------	------	1, 200	96	548, 200	27, 410	------	------	88, 800	3, 552
Spot	------	------	------	------	3, 000	45	------	------	------	------
Squeteagues or "sea trout":										
Spotted	------	------	4, 200	336	57, 000	3, 420	4, 400	320	85, 300	4, 476
White	------	------	------	------	------	------	1, 100	30	------	------
Sunfish	237, 600	7, 028	------	------	------	------	------	------	------	------
Tuna or "horse mackerel"	------	------	1, 300	41	------	------	------	------	------	------
Shrimp	------	------	9, 656, 300	298, 525	------	------	------	------	------	------
Clams, hard, public	------	------	32, 400	648	------	------	------	------	500	50
Oysters:										
Market, public, spring	------	------	------	------	------	------	10, 200	750	800	170
Market, public, fall	------	------	------	------	------	------	17, 000	1, 250	6, 800	1, 360
Market, private, spring	------	------	102, 800	2, 293	------	------	------	------	------	------
Market, private, fall	------	------	122, 900	2, 827	------	------	------	------	------	------
Scallops:										
Bay	------	------	------	------	------	------	------	------	2, 400	225
Sea	------	------	120, 200	17, 891	------	------	------	------	------	------
Turtles, soft shell	7, 400	76	------	------	------	------	------	------	------	------
Total	2, 220, 300	91, 001	10,244,300	333, 983	1,503,800	63, 989	180, 900	7, 023	1,488,600	50, 776

Species	Seminole		Taylor		Volusia		Wakulla		Walton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass	------	------	------	------	16, 000	$960	------	------	------	------
Bluefish	------	------	6, 600	$330	5, 000	280	10, 000	$500	------	------
Blue runner or hardtail	------	------	------	------	------	------	3, 000	60	------	------
Catfish and bullheads	430, 000	$15, 050	------	------	90, 500	3, 167	------	------	------	------
Crappie	7, 000	210	------	------	18, 500	740	------	------	------	------
Crevalle	------	------	------	------	3, 000	60	------	------	------	------
Croaker	------	------	------	------	4, 000	120	500	10	------	------
Drum:										
Black	------	------	------	------	30, 000	750	------	------	------	------
Red or redfish	------	------	24, 200	660	52, 000	1, 455	25, 000	684	3, 100	$84
Flounders	------	------	500	15	4, 000	250	200	6	------	------
Kingfish or "king mackerel"	------	------	500	20	------	------	------	------	------	------
King whiting or "kingfish"	------	------	------	------	45, 000	1, 250	------	------	------	------
Mullet	------	------	315, 000	9, 450	574, 000	15, 345	1, 136, 500	34, 095	90, 000	2, 700
Pigfish	------	------	------	------	20, 000	300	------	------	------	------
Pinfish or sailors choice	------	------	------	------	1, 000	20	------	------	------	------
Pompano	------	------	500	100	3, 000	600	1, 000	200	100	15
Shad	226, 000	13, 560	------	------	1, 000	120	------	------	------	------

Fisheries of Florida, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Seminole		Taylor		Volusia		Wakulla		Walton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sheepshead			2,800	$75	2,000	$40	5,500	$150	800	$21
Snapper, mangrove					1,500	30				
Spot					13,500	280				
Squeteagues or "sea trout", spotted			91,700	4,354	90,000	5,430	149,300	6,790	13,500	615
Sunfish	7,000	$210			27,300	819				
White perch	18,200	728								
Crabs, hard					8,000	240				
Shrimp					482,300	14,469				
Clams, hard, public					500	50				
Oysters:										
Market, public, spring					4,500	750	5,200	210	1,500	135
Market, public, fall							7,600	315	1,000	114
Market, private, spring					72,900	5,400				
Market, private, fall					38,700	2,940				
Turtles, soft shell					3,000	30				
Sponges:										
Grass			1,000	515						
Sheepswool			45,400	48,900						
Yellow			6,700	5,200						
Total	688,200	29,758	494,900	69,619	1,611,200	55,895	1,343,800	43,020	110,000	3,684

CATCH: BY DISTRICTS

Species	East coast		West coast		Lake Okeechobee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	214,900	$1,055				
Amberjack	2,500	55	1,500	$25		
Black bass	144,900	9,303			278,000	$15,892
Bluefish	1,445,400	81,007	488,500	19,668		
Blue runner or hardtail	60,700	1,224	120,400	1,850		
Cabio or crab eater			7,400	181		
Catfish and bullheads	2,039,300	70,349	63,000	1,968	751,900	21,160
Cigarfish			4,500	90		
Crappie	145,400	5,605			316,900	6,351
Crevalle	81,600	1,354	29,400	211		
Croaker	45,000	1,045	7,400	149		
Dolphin	8,000	240				
Drum:						
Black	89,000	1,960	11,100	205		
Red or redfish	144,200	3,820	872,700	20,457		
Eels	18,400	553				
Flounders	20,300	1,036	54,500	2,106		
Groupers	183,800	7,776	3,157,600	71,714		
Grunts	32,000	960	8,300	178		
Hickory shad	42,900	352				
Hogfish	6,000	180				
Jewfish	5,000	200	8,400	208		
Kingfish or "king mackerel"	1,977,500	89,673	660,600	26,424		
King whiting or "kingfish"	319,400	7,741	5,200	103		
Mackerel	200	9				
Menhaden	29,404,200	99,357	9,579,200	22,286		
Mojarro	5,000	100	14,100	291		
Mullet	4,061,500	92,131	19,904,800	548,996		
Muttonfish	175,800	7,810	23,100	1,029		
Permit			1,700	34		
Pigfish	56,000	1,005	38,800	818		
Pinfish or sailors choice	31,000	620				
Pompano	177,100	28,550	260,400	49,584		
Porgies	11,500	345	27,000	589		
Sawfish			17,500	35		
Sea bass	48,000	1,902	4,000	120		
Sea catfish			105,000	210		
Shad	782,200	66,986				
Sharks	200,000	1,000	3,017,500	7,535		
Sheepshead	124,000	2,580	481,900	10,686		
Skates			175,000	350		
Snapper:						
Mangrove	72,500	2,356	156,200	4,661		
Red	151,600	9,963	3,916,200	214,308		
Snook or sergeantfish	145,700	4,319	276,100	5,627		
Spanish mackerel	3,385,700	141,392	3,348,500	130,395		
Spot	80,500	1,605	1,600	37		

Fisheries of Florida, 1934—Continued

CATCH: BY DISTRICTS—Continued

Species	East coast		West coast		Lake Okeechobee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Squeteagues or "sea trout":						
Gray	10,000	$500				
Spotted	760,600	43,817	2,322,600	$119,458		
White			14,300	296		
Sturgeon			1,000	60		
Sunfish	299,900	9,177			217,600	$4,367
Swordfish	3,000	45				
Tenpounder			27,500	482		
Tripletail			600	12		
Tuna or "horse mackerel"	4,300	161				
Turbot	1,500	45				
Wahoo	2,000	60				
White perch	18,200	728				
Yellowtail	13,100	1,179	68,300	3,498		
Crabs:						
Hard	133,800	2,734	49,000	740		
King			500,000	600		
Stone	13,600	2,992	67,000	2,745		
Sea crawfish or "spiny lobster"	182,800	10,426	168,500	6,740		
Shrimp	14,752,700	451,685	1,539,500	46,185		
Clams:						
Coquina			5,800	975		
Hard, public	32,900	698	502,100	25,384		
Conchs			2,500	75		
Oysters:						
Market, public, spring	4,500	750	822,900	39,822		
Market, public, fall			509,700	30,573		
Market, private, spring	344,400	15,096	17,400	1,560		
Market, private, fall	330,300	13,170	6,800	660		
Scallops:						
Bay			74,100	6,596		
Sea	120,200	17,891				
Turtles:						
Green			4,600	244		
Soft shell	10,400	106	6,000	120	44,800	571
Sponges:						
Grass			45,400	24,699		
Sheepswool			458,500	720,257		
Velvet			200	110		
Wire			14,400	7,894		
Yellow			136,800	84,690		
Total	62,976,900	1,318,778	54,214,600	2,267,603	1,609,200	48,341

Sponge fishery of Florida, 1934

OPERATING UNITS: BY GEAR

Item	Sponge hooks	Diving outfits	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels		8	8
On boats and shore, regular	482	393	875
Total	482	401	883
Vessels, motor		1	1
Net tonnage		5	5
Boats:			
Motor		52	52
Other	241		241
Apparatus, number	241	53	294

CATCH: BY GEAR

Sponges	Sponge hooks		Diving outfits		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Grass	45,400	$24,699			45,400	$24,699
Sheepswool	129,900	190,756	328,600	$529,501	458,500	720,257
Velvet	200	110			200	110
Wire	300	88	14,100	7,806	14,400	7,894
Yellow	62,100	34,541	74,700	50,149	136,800	84,690
Total	237,900	250,194	417,400	587,456	655,300	837,650

SPONGES SOLD AT THE EXCHANGE, TARPON SPRINGS, FLA.

During 1934 sponges sold on the exchange at Tarpon Springs, Fla., amounted to 499,635 pounds, valued at $670,533. This is an increase of 34 percent in volume and 59 percent in value as compared with the transactions on the exchange in 1933. Of the total sponges sold, 137,879 pounds, valued at $287,062, were large wool; 28,751 pounds, valued at $34,654, were medium and small wool; 183,956 pounds, valued at $250,858, were wool rags; 105,572 pounds, valued at $70,560, were yellow; 29,391 pounds, valued at $19,503, were grass; and 14,086 pounds, valued at $7,806, were wire. It is estimated that sponges valued at $25,000 were sold outside the exchange.

ALABAMA

Fisheries of Alabama, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, stake	Trammel nets	Lines			Fyke nets
				Hand	Trot with baits or snoods	Trot with hooks	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				70			
On boats and shore:							
Regular	48	3	64	9	12	22	2
Casual			7	47	20	5	
Total	48	3	71	126	32	27	2
Vessels, motor				9			
Net tonnage				114			
Boats:							
Motor	9	1	25	2	2	4	2
Other	6	3	58	21	28	27	
Apparatus:							
Number	8	16	57	126	38	112	10
Length, yards	4,350						
Square yards		2,450	18,745				
Hooks, baits, or snoods				204	7,640	11,550	

Item	Otter trawls, shrimp	Pots, fish	Spears	Dredges, oyster	Tongs, oyster	By hand, other than for oysters	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	50			18	4		122
On boats and shore:							
Regular	270	16	2		94	2	436
Casual		3	58		8	44	125
Total	320	19	60	18	106	46	683
Vessels, motor	25			8	2		34
Net tonnage	225			58	16		339
Boats:							
Motor	135	3			42		184
Other		19			37		160
Apparatus:							
Number	160	78	60	9	106		
Yards at mouth	2,067			9			

Fisheries of Alabama, 1934—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets, stake		Trammel nets		Lines	
							Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	25,200	$588	-------	-------	3,400	$166	-------	-------
Blue runner or hardtail	2,900	58	-------	-------	-------	-------	-------	-------
Catfish and bullheads	200	4	-------	-------	2,200	88	2,400	$96
Crevalle	2,600	58	-------	-------	-------	-------	-------	-------
Croaker	10,800	196	-------	-------	9,000	164	1,400	26
Drum:								
Black	700	20	-------	-------	-------	-------	-------	-------
Red or redfish	19,300	776	-------	-------	37,500	1,374	7,900	292
Flounders	500	35	-------	-------	2,500	171	-------	-------
Groupers	-------	-------	-------	-------	-------	-------	151,200	3,356
King whiting or "kingfish"	3,800	70	-------	-------	900	18	100	2
Mullet	528,200	12,387	-------	-------	640,000	16,000	-------	-------
Pompano	-------	-------	-------	-------	1,800	270	-------	-------
Sheepshead	1,000	37	-------	-------	5,200	196	1,800	72
Snapper, red	-------	-------	-------	-------	-------	-------	950,500	51,859
Spanish mackerel	1,700	121	-------	-------	10,200	412	-------	-------
Spot	4,600	85	-------	-------	3,100	56	-------	-------
Squeteagues or "sea trout":								
Spotted	25,100	1,611	-------	-------	102,300	6,860	10,100	682
White	1,300	30	-------	-------	3,400	81	2,900	65
Sturgeon	-------	-------	8,400	$912	-------	-------	-------	-------
Tenpounder	1,200	12	-------	-------	-------	-------	-------	-------
Total	629,100	16,088	8,400	912	821,500	25,856	1,128,300	56,450

Species	Lines—Continued				Fyke nets		Otter trawls	
	Trot with baits or snoods		Trot with hooks					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	-------	-------	16,200	$648	2,400	$96	-------	-------
Catfish and bullheads	-------	-------	50,500	3,030	14,000	840	-------	-------
Paddlefish or spoonbill cat	-------	-------	600	36	-------	-------	-------	-------
Crabs, hard	257,400	$3,677	-------	-------	-------	-------	-------	-------
Shrimp	-------	-------	-------	-------	-------	-------	4,556,600	$115,176
Total	257,400	3,677	67,300	3,714	16,400	936	4,556,600	115,176

Species	Pots		Spears		Dredges		Tongs		By hand	
	Lb.	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*
Catfish and bullheads	51,300	$3,578	-------	-------	-------	-------	-------	-------	-------	-------
Flounders	-------	-------	32,900	$2,512	-------	-------	-------	-------	-------	-------
Crabs, soft	-------	-------	-------	-------	-------	-------	-------	-------	1,600	$312
Oysters:										
Market, public, spring	-------	-------	-------	-------	105,600	$6,224	89,900	$5,285	-------	-------
Market, public, fall	-------	-------	-------	-------	4,200	250	160,400	9,435	-------	-------
Market, private, spring	-------	-------	-------	-------	-------	-------	5,400	450	-------	-------
Market, private, fall	-------	-------	-------	-------	-------	-------	26,300	2,190	-------	-------
Terrapin, diamond back	-------	-------	-------	-------	-------	-------	-------	-------	1,400	361
Total	51,300	3,578	32,900	2,512	109,800	6,474	282,000	17,360	3,000	673

Fisheries of Alabama, 1934—Continued

OPERATING UNITS: BY COUNTIES

Item	Baldwin	Mobile
Fishermen:	*Number*	*Number*
On vessels	14	108
On boats and shore:		
Regular	65	371
Casual	33	92
Total	112	571
Vessels, motor	7	27
Net tonnage	72	267
Boats:		
Motor	24	160
Other	37	123
Apparatus:		
Haul seines	1	7
Length, yards	500	3,850
Gill nets, stake	16	
Square yards	2,450	
Trammel nets	22	35
Square yards	8,390	10,355
Lines:		
Hand	15	111
Hooks	15	189
Trot with baits or snoods		38
Baits or snoods		7,640
Trot with hooks	4	108
Hooks	750	10,800
Fyke nets		10
Otter trawls, shrimp	15	145
Yards at mouth	189	1,878
Pots, fish		78
Spears	22	38
Dredges, oyster		9
Yards at mouth		9
Tongs, oyster	26	80

CATCH: BY COUNTIES

Species	Baldwin		Mobile	
	Pounds	*Value*	*Pounds*	*Value*
Bluefish	3,900	$177	24,700	$577
Blue runner or hardtail	600	12	2,300	46
Buffalofish			18,600	744
Catfish and bullheads	6,500	370	114,100	7,266
Crevalle			2,600	58
Croaker	5,700	104	15,500	282
Drum:				
Black	200	6	500	14
Red or redfish	27,700	1,012	37,000	1,430
Flounders	3,600	269	32,300	2,449
Groupers			151,200	3,356
King whiting or "kingfish"	300	6	4,500	84
Mullet	283,000	7,085	885,200	21,302
Paddlefish or spoonbill cat			600	36
Pompano	1,600	240	200	30
Sheepshead	3,700	144	4,300	161
Snapper, red			950,500	51,859
Spanish mackerel	10,600	442	1,300	91
Spot	2,000	38	5,700	103
Squeteagues or "sea trout":				
Spotted	44,200	3,184	93,300	5,969
White			7,600	176
Sturgeon	8,400	912		
Tenpounder			1,200	12
Crabs:				
Hard			257,400	3,677
Soft			1,600	312
Shrimp	392,000	8,976	4,164,600	106,200
Oysters:				
Market, public, spring	8,500	500	187,000	11,009
Market, public, fall	17,000	1,000	147,600	8,685
Market, private, spring	5,400	450		
Market, private, fall	26,300	2,190		
Terrapin, diamond back	800	203	600	158
Total	852,000	27,320	7,112,000	226,086

MISSISSIPPI

Fisheries of Mississippi, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Lines: Hand	Lines: Trot with baits or snoods	Dip nets, drop	Cast nets
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels			15			
On boats and shore:						
Regular	6	41	12	86		
Casual			132	13	30	64
Total	6	41	159	99	30	64
Vessels, motor			3			
Net tonnage			25			
Boats:						
Motor	1	18	9	32		
Other	1	31	94	65	14	
Apparatus:						
Number	1	27	159	99	120	64
Length, yards	300					
Square yards		7, 370				
Hooks, baits, or snoods			178	19, 260		

Item	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs, oyster	By hand, other than for oysters	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	164		520			557
On boats and shore:						
Regular	568	2	276	217		917
Casual		70		7	38	232
Total	732	72	796	224	38	1, 706
Vessels, motor	82		130			144
Net tonnage	916		1, 777			1, 905
Boats:						
Motor	284		69	8		341
Other				208		361
Apparatus:						
Number	366	72	398	224		
Yards at mouth	4, 658		398			

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines: Hand		Lines: Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			14, 000	$280	16, 300	$326		
Croaker			6, 000	150	7, 600	189		
Drum:								
Black			2, 200	36	1, 600	23		
Red or redfish	8, 000	$320	53, 300	2, 100	11, 700	468		
Flounders			4, 500	225				
Groupers					55, 000	1, 250		
King whiting or "kingfish"			2, 200	54	1, 400	35		
Mullet	137, 000	2, 740	482, 000	10, 950				
Sheepshead	8, 000	320	13, 300	532	1, 700	68		
Snapper, red					123, 200	6, 720		
Squeteagues or "sea trout":								
Spotted	12, 000	720	82, 500	4, 950	52, 400	3, 144		
White	30, 000	750	73, 000	1, 825	50, 500	1, 263		
Crabs, hard							548, 100	$6, 412
Total	195, 000	4, 850	733, 000	21, 102	321, 400	13, 486	548, 100	6, 412

Fisheries of Mississippi, 1934—Continued

CATCH: BY GEAR—Continued

Species	Dip nets, drop		Cast nets		Otter trawls, shrimp		Spears	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders					6,500	$325	31,000	$1,860
Mullet			25,500	$532				
Crabs, hard	54,600	$702						
Shrimp:								
Mississippi			6,500	650	6,589,200	125,512		
Louisiana					8,734,100	166,360		
Total	54,600	702	32,000	1,182	15,329,800	292,197	31,000	1,860

Species	Dredges		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, soft					4,200	$720
Oysters:						
Market, public, spring, Mississippi	26,700	$1,805	55,400	$4,693		
Market, public, fall, Mississippi	155,400	10,500	60,600	5,126		
Market, public, spring, Louisiana	3,659,600	237,202	8,100	674		
Market, public, fall, Louisiana	937,700	49,759	400	31		
Total	4,779,400	299,266	124,500	10,524	4,200	720

OPERATING UNITS: BY COUNTIES

Item	Hancock	Harrison	Jackson
	Number	*Number*	*Number*
Fishermen:			
On vessels		538	19
On boats and shore:			
Regular	48	744	125
Casual	40	138	54
Total	88	1,420	198
Vessels, motor		139	5
Net tonnage		1,827	78
Boats:			
Motor	14	277	50
Other	30	275	56
Apparatus:			
Haul seines			1
Length, yards			300
Trammel nets	6	10	11
Square yards	1,800	2,465	3,105
Lines:			
Hand	29	94	36
Hooks	29	104	45
Trot with baits or snoods		88	11
Baits or snoods		18,100	1,160
Dip nets, drop	120		
Cast nets		57	7
Otter trawls, shrimp		319	47
Yards at mouth		4,080	578
Spears	10	42	20
Dredges, oyster	16	370	12
Yards at mouth	16	370	12
Tongs, oyster	4	191	29

Fisheries of Mississippi, 1934—Continued

CATCH: By counties

Species	Hancock		Harrison		Jackson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish or bullheads	2, 100	$42	22, 800	$456	5, 400	$108
Croaker	1, 700	42	7, 800	194	4, 100	103
Drum:						
Black	1, 100	17	1, 700	22	1, 000	20
Red or redfish	18, 500	740	31, 700	1, 268	22, 800	880
Flounders	7, 500	425	29, 700	1, 705	4, 800	280
Groupers	--------	--------	38, 500	875	16, 500	375
King whiting or "kingfish"	1, 400	35	2, 100	52	100	2
Mullet	75, 000	1, 500	127, 500	2, 822	442, 000	9, 900
Sheepshead	1, 600	64	2, 700	108	18, 700	748
Snapper, red	--------	--------	88, 000	4, 800	35, 200	1, 920
Squeteagues or "sea trout":						
Spotted	38, 000	2, 280	62, 000	3, 720	46, 900	2, 814
White	30, 000	750	55, 000	1, 375	68, 500	1, 713
Crabs:						
Hard	54, 600	702	506, 100	5, 932	42, 000	480
Soft	1, 400	280	2, 800	440	--------	--------
Shrimp:						
Mississippi	--------	--------	4, 287.900	82, 084	2, 307, 800	44, 078
Louisiana	--------	--------	8, 219, 400	156, 560	514, 700	9, 800
Oysters:						
Market, public, spring, Mississippi	6, 600	562	33, 300	2, 819	42, 200	3, 117
Market, public, fall, Mississippi	164, 500	11, 269	2, 400	205	49, 100	4, 152
Market, public, spring, Louisiana	--------	--------	3, 592, 900	233, 023	74, 800	4, 853
Market, public, fall, Louisiana	--------	--------	938, 100	49, 790	--------	--------
Total	404, 000	18, 708	18, 052, 400	548, 250	3, 696, 600	85, 343

LOUISIANA

Fisheries of Louisiana, 1934

OPERATING UNITS: By gear

Item	Haul seines	Trammel nets	Lines			Dip nets	
			Hand	Trot with baits or snoods	Trot with hooks	Common	Drop
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11	6	5	--------	--------	--------	--------
On boats and shore:							
Regular	568	76	89	242	--------	94	187
Casual	64	58	149	138	4	65	113
Total	643	140	243	380	4	159	300
Vessels, motor	2	3	1	--------	--------	--------	--------
Net tonnage	13	20	5	--------	--------	--------	--------
Boats:							
Motor	78	63	72	37	--------	--------	13
Other	111	--------	71	343	4	153	283
Accessory boats	1	--------	--------	--------	--------	--------	--------
Apparatus:							
Number	95	75	242	380	4	159	13, 369
Length, yards	21, 404	--------	--------	--------	--------	--------	--------
Square yards	--------	13, 599	--------	--------	--------	--------	--------
Hooks, baits, or snoods	--------	--------	253	83, 035	1, 800	--------	--------

Fisheries of Louisiana, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Cast nets	Otter trawls, shrimp	Brush traps	Dredges, oyster	Tongs, oyster	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	----------	240	----------	59	111	369
On boats and shore:						
Regular	59	2,993	101	32	647	4,529
Casual	119	----------	----------	6	----------	626
Total	178	3,233	101	97	758	5,524
Vessels, motor	----------	112	----------	17	45	151
Net tonnage	----------	754	----------	166	313	1,056
Boats:						
Motor	----------	1,499	----------	15	3	1,698
Other	68	----------	101	----------	343	1,243
Accessory boats	----------	----------	----------	----------	61	62
Apparatus:						
Number	178	1,611	25,250	57	758	----------
Yards at mouth	----------	19,354	----------	58	----------	----------

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines			
					Hand		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	84,200	$2,918	69,100	$2,468	43,700	$1,484	----------	-------
Crevalle	100	4	1,000	31	----------	--------	----------	-------
Croaker	145,000	7,138	67,500	3,192	84,400	4,367	----------	-------
Drum:								
Black	74,100	2,613	66,300	2,415	58,100	2,100	----------	-------
Red or redfish	128,200	7,650	180,900	10,163	182,500	10,278	----------	-------
Flounders	4,900	381	16,800	1,317	2,600	197	----------	-------
Garfish	----------	--------	500	2	----------	--------	----------	-------
Groupers	----------	--------	----------	--------	18,400	770	----------	-------
Jewfish	300	9	1,300	38	3,400	93	----------	-------
Kingfish or "king mackerel"	1,200	49	12,200	396	----------	--------	----------	-------
Mullet	16,400	251	1,600	27	----------	--------	----------	-------
Sheepshead	152,100	8,367	78,000	4,147	37,400	2,042	----------	-------
Snapper, red	----------	--------	----------	--------	79,000	4,550	----------	-------
Spanish mackerel	----------	--------	----------	--------	1,900	96	----------	-------
Spot	200	10	1,700	57	----------	--------	----------	-------
Squeteagues or "sea trout":								
Spotted	385,300	30,389	250,200	20,216	433,500	35,941	----------	-------
White	244,600	5,844	122,800	3,112	77,500	2,082	----------	-------
Tripletail	----------	--------	----------	--------	200	4	----------	-------
Crabs, hard	496,000	16,352	----------	--------	----------	--------	8,624,900	$88,060
Shrimp	5,769,500	149,888	----------	--------	----------	--------	----------	-------
Turtles, loggerhead	3,500	70	----------	--------	----------	--------	----------	-------
Total	7,505,600	231,933	869,900	47,581	1,022,600	64,004	8,624,900	88,060

Species	Lines—Con.		Dip nets				Cast nets	
	Trot with hooks		Common		Drop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker	4,000	$480	----------	--------	----------	--------	----------	-------
Drum, red or redfish	900	109	----------	--------	----------	--------	----------	-------
Squeteagues or "sea trout", spotted	4,000	500	----------	--------	----------	--------	----------	-------
Crabs:								
Hard	--------	-------	353,100	$6,364	2,202,500	$53,166	----------	-------
Soft	--------	-------	131,100	19,869	----------	--------	----------	-------
Shrimp	--------	-------	----------	--------	----------	--------	553,700	$10,918
Total	8,900	1,089	484,200	26,233	2,202,500	53,166	553,700	10,918

Fisheries of Louisiana, 1934—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Brush traps		Dredges		Tongs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, soft			520, 100	$65, 700				
Shrimp	49, 249, 100	$1, 281, 564						
Oysters:								
Market, public, spring					1, 006, 900	$75, 424	36, 800	$3, 892
Market, public, fall					253, 100	32, 105	23, 300	2, 100
Market, private, spring					14, 900	1, 491	1, 957, 800	131, 089
Market, private, fall					5, 300	558	2, 293, 600	167, 656
Total	49, 249, 100	1, 281, 564	520, 100	65, 700	1, 280, 200	109, 578	4, 311, 500	304, 737

NOTE.—The catch as shown above for Louisiana does not include the following products which were taken by Mississippi craft in Louisiana waters: Shrimp, 8,734,100 pounds, valued at $166,360; and oysters, market, spring, 3,667,700 pounds, of meats, valued at $237,876, and oysters, market, fall, 938,100 pounds of meats, valued at $49,790. These products have been included with the Mississippi catch.

OPERATING UNITS: BY PARISHES

Item	Calcasieu	Cameron	Iberia	Jefferson Davis	Jefferson	La Fourche	Orleans	Plaquemines
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					44	120	63	40
On boats and shore:								
Regular		6	8	2	1, 180	760	207	491
Casual	3		2	2	38		121	40
Total	3	6	10	4	1, 262	880	391	571
Vessels, motor					19	46	20	20
Net tonnage					143	311	177	122
Boats:								
Motor	1	3	5	2	368	314	53	185
Other	1				284	81	123	91
Accessory boats					4	32	2	10
Apparatus:								
Haul seines					25	1	21	4
Length, yards					10, 570	400	2, 263	1, 560
Trammel nets			1		10	1	2	28
Square yards			175		1, 903	180	450	5, 175
Lines:								
Hand	2			4	25		68	27
Hooks	2			4	25		79	27
Trot with baits or snoods					132		18	11
Bait or snoods					38, 185		7, 450	1, 650
Dip nets:								
Common	1						24	
Drop					1, 950		5, 417	
Brush traps					25, 250			
Cast nets					30		78	
Otter trawls, shrimp		3	2	1	354	347	26	174
Yards at mouth		35	24	12	4, 278	4, 178	337	2, 096
Dredges, oyster			2		8	4	26	11
Yards at mouth			2		8	4	26	11
Tongs, oyster					14	209	8	155

Item	St. Bernard	St. Charles	St. John the Baptist	St. Mary	St. Tammany	Tangipahoa	Terrebonne	Vermilion
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11				2		89	
On boats and shore:								
Regular	383	80	1	138	42	13	1, 216	2
Casual	150	24	40	64	36	7	93	6
Total	544	104	41	202	80	20	1, 398	8
Vessels, motor	3				1		42	
Net tonnage	22				9		272	
Boats:								
Motor	157	46		42	1		517	4
Other	208	18	39	113	76	20	189	

Fisheries of Louisiana, 1934—Continued

OPERATING UNITS: BY PARISHES—Continued

Item	St. Bernard	St. Charles	St. John the Baptist	St. Mary	St. Tammany	Tangipahoa	Terrebonne	Vermilion
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Accessory boats	1				1		12	
Apparatus:								
Haul seines	24		12	1	2		5	
Length, yards	4,780		520	165	166		980	
Trammel nets	7						25	1
Square yards	1,330						4,226	160
Lines:								
Hand	1			14	60		41	
Hooks	1			14	60		41	
Trot with baits or snoods	90	24	2	100	1		2	
Bait or snoods	14,800	3,600	500	16,500	50		300	
Trots, with hooks			4					
Hooks			1,800					
Dip nets:								
Common	82				39	13		
Drop	3,817				1,730	455		
Cast nets						20	50	
Otter trawls, shrimp	116	40		20			528	
Yards at mouth	1,424	457		232			6,281	
Dredges, oyster	2							4
Yards at mouth	2							5
Tongs, oyster	1			49	3		319	

CATCH: BY PARISHES

Species	Calcasieu		Cameron		Iberia		Jefferson Davis	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	500	$15			1,600	$66		
Croaker	500	27			1,800	91		
Drum:								
Black					2,200	110		
Red or redfish	800	49			6,400	384		
Sheepshead	300	14			1,600	78		
Squeteagues or "sea trout", spotted	2,100	164			7,200	577	6,400	$512
Crabs, hard	4,900	178						
Shrimp			60,100	$1,804	24,200	723	12,000	360
Oysters:								
Market, private, spring					8,500	851		
Market, private, fall					2,700	286		
Total	9,100	447	60,100	1,804	56,200	3,166	18,400	872

Species	Jefferson		La Fourche		Orleans		Plaquemines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	8,400	$290	1,200	$37	67,300	$2,323	39,500	$1,357
Crevalle							1,100	35
Croaker	8,900	414	1,600	63	110,100	5,452	70,500	3,290
Drum:								
Black	7,700	276	1,500	59	54,800	1,954	52,800	1,883
Red or redfish	16,800	977	1,900	116	69,400	4,164	118,000	6,695
Flounders	3,600	291	1,400	109	900	73	5,100	386
Garfish			500	2				
Groupers					18,400	770		
Jewfish					3,400	93	1,600	47
Kingfish or "king mackerel"							3,600	108
Mullet					14,900	220		
Sheepshead	11,400	612	1,800	109	139,300	7,641	51,000	2,810
Snapper, red					79,000	4,550		
Spanish mackerel	400	21					1,500	75
Squeteagues or "sea trout":								
Spotted	35,700	2,936	3,200	259	318,300	25,414	214,600	17,165
White	9,600	259	1,600	33	219,500	5,696	63,600	1,388
Tripletail	200	4						
Crabs:								
Hard	5,416,700	53,183			1,647,500	47,118	108,000	960
Soft	520,100	65,700			26,700	4,199		
Shrimp	14,051,700	363,922	10,475,500	271,506	1,084,000	26,317	5,991,500	154,159
Oysters:								
Market, public, spring	218,500	13,309	284,500	16,255	375,400	39,373	145,600	8,323
Market, public, fall	25,300	2,218			227,800	29,887		
Market, private, spring	25,300	1,990	383,000	29,783	12,000	700	870,900	50,650
Market, private, fall	25,800	2,066	380,700	30,461	16,500	1,098	1,195,300	80,667
Turtles, loggerhead					3,500	70		
Total	20,386,100	508,468	11,538,400	348,792	4,488,700	207,112	8,934,200	329,998

Fisheries of Louisiana, 1934—Continued

CATCH: By parishes—Continued

Species	St. Bernard		St. Charles		St. John the Baptist		St. Mary	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	27,000	$917	----------	--------	--------	--------	2,900	$112
Croaker	62,400	3,022	----------	--------	4,000	$480	7,900	330
Drum:								
Black	33,400	1,160	----------	--------	--------	--------	5,100	198
Red or redfish	63,400	3,759	----------	--------	900	109	19,100	982
Flounders	1,400	95	----------	--------	--------	--------	----------	--------
Mullet	800	12	----------	--------	--------	--------	----------	--------
Sheepshead	27,900	1,556	----------	--------	--------	--------	4,100	190
Spot	700	17	----------	--------	--------	--------	----------	--------
Squeteagues or "sea trout":								
Spotted	165,200	12,985	----------	--------	4,000	500	25,700	2,060
White	89,600	1,931	----------	--------	--------	--------	----------	--------
Crabs:								
Hard	2,315,400	34,373	288,000	$4,320	13,300	362	1,602,100	16,374
Soft	23,400	3,690	----------	--------	--------	--------	----------	--------
Shrimp	5,034,900	130,561	1,257,600	37,609	19,700	788	559,600	14,511
Oysters:								
Market, public, spring	18,200	1,656	----------	--------	--------	--------	----------	--------
Market, public, fall	21,100	1,690	----------	--------	--------	--------	----------	--------
Market, private, spring	----------	--------	----------	--------	--------	--------	89,800	6,980
Market, private, fall	----------	--------	----------	--------	--------	--------	90,600	7,247
Total	7,884,800	197,424	1,545,600	41,929	41,900	2,239	2,406,900	48,984

Species	St. Tammany		Tangipahoa		Terrebonne		Vermilion	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	--------	--------	--------	--------	47,600	$1,722	1,000	$31
Croaker	7,600	$756	--------	--------	24,400	1,206	1,200	46
Drum:								
Black	--------	--------	--------	--------	39,400	1,406	1,600	82
Red or redfish	5,100	307	--------	--------	188,100	10,500	2.600	158
Flounders	--------	--------	--------	--------	11,900	941	--------	--------
Kingfish or "king mackerel"	--------	--------	--------	--------	9,800	337	--------	--------
Mullet	--------	--------	--------	--------	2,300	46	--------	--------
Sheepshead	--------	--------	--------	--------	29,200	1,500	900	46
Spot	--------	--------	--------	--------	1,200	50	--------	--------
Squeteagues or "sea trout":								
Spotted	70,300	6,406	--------	--------	217,200	17,816	3,100	252
White	--------	--------	--------	--------	61,000	1,731	--------	--------
Crabs:								
Hard	145,100	4,324	77,000	$2,100	58,500	650	--------	--------
Soft	43,900	6,130	37,100	5,850	----------	--------	--------	--------
Shrimp	--------	--------	20,400	816	16,981,100	439,294	--------	--------
Oysters:								
Market, public, spring	1,500	400	--------	--------	----------	--------	--------	--------
Market, public, fall	2,200	410	--------	--------	----------	--------	--------	--------
Market, private, spring	--------	--------	--------	--------	576,800	40,986	6,400	640
Market, private, fall	--------	--------	--------	--------	584,700	46,117	2,600	272
Total	275,700	18,733	134,500	8,766	18,833,200	564,302	19,400	1,527

TEXAS

Fisheries of Texas, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets: Run-around	Gill nets: Stake	Trammel nets	Lines: Hand	Lines: Troll	Lines: Trot with baits or snoods	Lines: Trot with hooks
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	--------	--------	--------	--------	54	--------	--------	--------
On boats and shore:								
Regular	2	39	143	148	102	--------	--------	80
Casual	47	--------	1	25	200	17	36	11
Total	49	39	144	173	356	17	36	91
Vessels, motor	--------	--------	--------	--------	9	--------	--------	--------
Net tonnage	--------	--------	--------	--------	136	--------	--------	--------
Boats:								
Motor	--------	16	31	69	69	10	--------	30
Other	3	3	33	15	136	--------	36	39
Apparatus:								
Number	23	84	215	85	356	17	36	68
Length, yards	2,500	--------	--------	--------	--------	--------	--------	--------
Square yards	--------	18,344	53,662	40,240	--------	--------	--------	--------
Hooks, baits, or snoods	--------	--------	--------	--------	356	17	13,200	52,150

Item	Dip nets	Cast nets	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs, oyster	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	--------	--------	57	--------	20	--------	114
On boats and shore:							
Regular	--------	--------	591	--------	121	86	1,068
Casual	6	1	--------	105	--------	110	459
Total	6	1	648	105	141	196	1,641
Vessels, motor	--------	--------	27	--------	6	--------	35
Net tonnage	--------	--------	232	--------	54	--------	345
Boats:							
Motor	--------	--------	292	--------	41	9	462
Other	6	1	--------	21	--------	99	345
Apparatus:							
Number	6	1	319	105	48	196	--------
Yards at mouth	--------	--------	5,066	--------	53	--------	--------

CATCH: BY GEAR

Species	Haul seines		Gill nets				Trammel nets	
			Runaround		Stake			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	1,500	$30	4,200	$106	11,200	$279	22,900	$635
Croaker	7,700	228	14,400	484	39,000	1,286	148,400	4,625
Drum:								
Black	26,400	716	373,600	9,527	1,124,000	28,387	172,400	5,065
Red or redfish	39,500	2,366	119,400	7,172	335,400	20,123	692,700	42,254
Flounders	5,600	465	4,500	370	4,300	378	27,500	2,457
Mullet	39,100	782	--------	--------	--------	--------	--------	--------
Pompano	--------	--------	--------	--------	--------	--------	900	162
Sheepshead, salt water	9,400	302	13,800	478	34,400	1,548	140,200	4,384
Snook or sergeantfish	--------	--------	--------	--------	--------	--------	4,800	429
Spanish mackerel	6,800	410	12,700	833	15,100	1,057	52,500	3,191
Squeteagues or "sea trout":								
Spotted	63,100	4,606	199,600	14,194	594,500	42,196	949,600	71,383
White	3,600	77	5,900	137	13,800	328	63,800	1,817
Total	202,700	9,982	748,100	33,301	2,171,700	95,582	2,275,700	136,402

Fisheries of Texas, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines								Dip nets	
	Hand		Troll		Trot with baits or snoods		Trot with hooks			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	10,100	$280	--------	--------	--------	--------	13,200	$382	--------	--------
Croaker	50,500	1,591	--------	--------	--------	--------	36,100	1,119	--------	--------
Drum:										
Black	281,500	7,745	--------	--------	--------	--------	274,800	8,208	--------	--------
Red or redfish	210,800	12,644	--------	--------	--------	--------	181,300	10,874	--------	--------
Flounders	15,500	1,299	--------	--------	--------	--------	2,100	176	--------	--------
Groupers	3,700	80	--------	--------	--------	--------	--------	--------	--------	--------
Jewfish	28,300	695	--------	--------	--------	--------	--------	--------	--------	--------
Kingfish or "king mackerel"	--------	--------	9,600	$384	--------	--------	--------	--------	--------	--------
Pompano	1,500	165	--------	--------	--------	--------	--------	--------	--------	--------
Sheepshead, salt water	50,700	1,602	--------	--------	--------	--------	42,300	1,471	--------	--------
Snapper, red	635,400	36,092	--------	--------	--------	--------	--------	--------	--------	--------
Snook or sergeantfish	1,700	136	--------	--------	--------	--------	--------	--------	--------	--------
Spanish mackerel	53,000	3,436	25,200	1,512	--------	--------	8,300	562	--------	--------
Squeteagues or "sea trout":										
Spotted	336,700	24,973	--------	--------	--------	--------	208,200	16,061	--------	--------
White	14,300	371	--------	--------	--------	--------	8,800	221	--------	--------
Crabs, hard	--------	--------	--------	--------	204,300	$10,748	--------	--------	53,800	$1,956
Total	1,693,700	91,109	34,800	1,896	204,300	10,748	775,100	39,074	53,800	1,956

Species	Cast nets		Otter trawls		Spears		Dredges		Tongs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	--------	--------	--------	--------	38,200	$3,324	--------	--------	--------	--------
Mullet	500	$10	--------	--------	--------	--------	--------	--------	--------	--------
Shrimp	--------	--------	16,358,600	$383,054	--------	--------	--------	--------	--------	--------
Oysters:										
Market, public, spring	--------	--------	--------	--------	--------	--------	301,200	$26,903	388,500	$27,181
Market, public, fall	--------	--------	--------	--------	--------	--------	244,500	21,324	377,600	29,796
Total	500	10	16,358,600	383,054	38,200	3,324	545,700	48,227	766,100	56,977

OPERATING UNITS: BY COUNTIES

Item	Aransas	Brazoria	Calhoun	Cameron	Galveston	Harris
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	4	--------	12	5	55	--------
On boats and shore:						
Regular	100	9	189	121	196	16
Casual	20	25	5	28	104	31
Total	124	34	206	154	355	47
Vessels, motor	2	--------	4	1	11	--------
Net tonnage	19	--------	26	6	157	--------
Boats:						
Motor	42	12	88	34	89	2
Other	22	10	4	39	51	30
Apparatus:						
Haul seines	--------	--------	--------	1	14	--------
Length, yards	--------	--------	--------	100	1,600	--------
Gill nets:						
Runaround	24	--------	--------	29	--------	--------
Square yards	4,008	--------	--------	9,686	--------	--------
Stake	45	--------	--------	99	--------	--------
Square yards	7,470	--------	--------	33,066	--------	--------
Trammel nets	12	1	29	--------	12	10
Square yards	6,384	533	14,652	--------	5,365	2,666
Lines:						
Hand	22	10	14	38	88	5
Hooks	22	10	14	38	88	5
Troll	--------	10	--------	7	--------	--------
Hooks	--------	10	--------	7	--------	--------
Trot with baits or snoods	--------	--------	--------	--------	17	12
Baits or snoods	--------	--------	--------	--------	6,400	4,000
Trot with hooks	4	3	1	--------	--------	--------
Hooks	1,400	900	1,500	--------	--------	--------

Fisheries of Texas, 1934—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Aransas	Brazoria	Calhoun	Cameron	Galveston	Harris
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Dip nets	6	----------	----------	----------	----------	----------
Otter trawls, shrimp	25	2	60	13	83	1
Yards at mouth	385	27	950	205	1,405	12
Spears	----------	4	----------	6	7	----------
Dredges, oyster	14	----------	20	----------	1	1
Yards at mouth	16	----------	22	----------	1	1
Tongs, oyster	12	10	8	28	42	11

Item	Jefferson	Kleberg	Matagorda	Nueces	Refugio	San Patricio
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	----------	----------	15	7	----------	16
On boats and shore:						
Regular	----------	26	140	147	----------	124
Casual	7	----------	41	149	8	41
Total	7	26	196	303	8	181
Vessels, motor	----------	----------	6	3	----------	8
Net tonnage	----------	----------	50	27	----------	60
Boats:						
Motor	----------	5	58	66	----------	66
Other	7	21	31	90	9	32
Apparatus:						
Haul seines	----------	----------	----------	8	----------	----------
Length, yards	----------	----------	----------	800	----------	----------
Gill nets:						
Runaround	----------	----------	----------	31	----------	----------
Square yards	----------	----------	----------	4,650	----------	----------
Stake	----------	----------	----------	62	----------	9
Square yards	----------	----------	----------	11,558	----------	1,568
Trammel nets	----------	----------	11	----------	----------	10
Square yards	----------	----------	5,320	----------	----------	5,320
Lines:						
Hand	7	18	1	109	----------	44
Hooks	7	18	1	109	----------	44
Trot with baits or snoods	7	----------	----------	----------	----------	----------
Baits or snoods	2,800	----------	----------	----------	----------	----------
Trot with hooks	----------	26	2	19	8	5
Hooks	----------	26,000	700	19,350	1,600	700
Cast nets	----------	----------	----------	1	----------	----------
Otter trawls, shrimp	----------	----------	49	32	----------	54
Yards at mouth	----------	----------	744	486	----------	852
Spears	----------	----------	15	68	----------	5
Dredges, oyster	----------	----------	10	2	----------	----------
Yards at mouth	----------	----------	11	2	----------	----------
Tongs, oyster	----------	----------	56	15	6	8

CATCH: BY COUNTIES

Species	Aransas		Brazoria		Calhoun		Cameron	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	9,700	$244	----------	----------	18,000	$503	6,400	$155
Croaker	34,100	1,260	800	$23	84,800	2,543	14,600	365
Drum:								
Black	73,000	1,897	1,400	42	39,500	1,180	1,530,000	38,252
Red or redfish	97,400	5,844	78,300	4,696	328,200	19,695	349,700	20,986
Flounders	4,900	389	1,000	112	12,700	1,199	11,000	885
Groupers	----------	----------	----------	----------	----------	----------	1,200	30
Jewfish	----------	----------	----------	----------	----------	----------	5,000	200
Kingfish or "king mackerel"	----------	----------	6,400	256	----------	----------	3,200	128
Sheepshead, salt water	39,000	1,558	1,100	33	72,100	2,159	10,800	667
Snapper, red	----------	----------	6,300	410	----------	----------	53,400	3,474
Spanish mackerel	29,100	2,133	20,100	1,206	41,700	2,270	11,900	778
Squeteagues or "sea trout":								
Spotted	185,000	12,952	82,600	6,614	326,200	24,063	643,100	45,018
White	14,600	365	500	14	40,200	1,154	5,400	131
Crabs, hard	53,800	1,956	----------	----------	----------	----------	----------	----------
Shrimp	1,258,100	29,441	82,900	1,941	3,042,300	71,192	662,300	15,756
Oysters:								
Market, public, spring	103,600	8,174	8,600	600	131,700	9,860	12,600	875
Market, public, fall	83,300	6,613	8,300	640	143,000	11,046	13,700	980
Total	1,985,600	72,826	298,300	16,587	4,280,400	146,864	3,334,300	128,680

Fisheries of Texas, 1934—Continued

CATCH: BY COUNTIES—Continued

Species	Galveston		Harris		Jefferson		Kleberg	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	--------	--------	--------	--------	--------	--------	12, 100	$364
Croaker	40, 000	$1, 198	--------	--------	2, 800	$84	16, 100	485
Drum:								
Black	27, 000	821	--------	--------	6, 200	186	274, 600	8, 240
Red or redfish	171, 600	10, 368	62, 100	$4, 347	13, 400	804	36, 400	2, 181
Flounders	10, 800	1, 003	1, 500	150	--------	--------	4, 200	375
Groupers	2, 500	50	--------	--------	--------	--------	--------	--------
Jewfish	3, 100	93	--------	--------	--------	--------	--------	--------
Mullet	39, 100	782	--------	--------	--------	--------	--------	--------
Sheepshead, salt water	59, 400	1, 801	--------	--------	2, 200	66	20, 200	808
Snapper, red	575, 700	32, 208	--------	--------	--------	--------	--------	--------
Spanish mackerel	9, 100	636	--------	--------	--------	--------	8, 300	593
Squeteagues or "sea trout":								
Spotted	348, 700	26, 199	77, 300	6, 648	15, 600	1, 248	32, 400	2, 585
White	17, 900	537	--------	--------	900	27	--------	--------
Crabs, hard	87, 900	4, 700	83, 100	4, 536	33, 300	1, 512	--------	--------
Shrimp	4, 531, 800	106, 043	37, 700	882	--------	--------	--------	--------
Oysters:								
Market, public, spring	130, 000	9, 317	37, 500	2, 600	--------	--------	--------	--------
Market, public, fall	106, 500	9, 416	33, 700	2, 760	--------	--------	--------	--------
Total	6, 161, 100	205, 172	332, 900	21, 923	74, 400	3, 927	404, 300	15, 631

Species	Matagorda		Nueces		Refugio		San Patricio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	--------	--------	7, 700	$183	--------	--------	9, 200	$263
Croaker	17, 700	$533	35, 500	1, 063	1, 000	$31	48, 700	1, 748
Drum:								
Black	80, 400	2, 411	151, 100	4, 533	--------	--------	69, 500	2, 086
Red or redfish	164, 600	9, 875	173, 700	10, 413	9, 100	544	94, 600	5, 680
Flounders	4, 100	457	27, 400	2, 205	--------	--------	20, 100	1, 694
Jewfish	--------	--------	15, 100	302	--------	--------	5, 100	100
Mullet	--------	--------	500	10	--------	--------	--------	--------
Pompano	900	162	1, 200	132	--------	--------	300	33
Sheepshead, salt water	15, 500	468	30, 600	922	1, 400	43	38, 500	1, 260
Snook or sergeantfish	--------	--------	1, 700	136	--------	--------	4, 800	429
Spanish mackerel	--------	--------	30, 600	1, 789	--------	--------	22, 800	1, 596
Squeteagues or "sea trout":								
Spotted	163, 900	12, 398	166, 400	12, 989	11, 100	890	299, 400	21, 809
White	7, 200	193	15, 400	306	--------	--------	8, 100	224
Shrimp	2, 406, 900	56, 325	1, 556, 700	36, 428	--------	--------	2, 779, 900	65, 046
Oysters:								
Market, public, spring	212, 600	18, 844	25, 700	1, 913	10, 000	695	17, 400	1, 206
Market, public, fall	175, 300	15, 121	26, 500	2, 120	5, 600	404	26, 200	2, 020
Total	3, 249, 100	116, 787	2, 265, 800	75, 444	38, 200	2, 607	3, 444, 600	105, 194

FISHERIES OF THE PACIFIC COAST STATES[11]

The yield of the commercial fisheries of the Pacific Coast States (Washington, Oregon, and California) during 1934 amounted to 1,546,102,000 pounds, valued at $19,950,059 to the fishermen, representing an increase of 80 percent in volume and 43 percent in value as compared with the catch in the previous year. These fisheries gave employment to 19,232 fishermen as compared with 18,673 in 1933.

There were 323 fishery wholesale and manufacturing establishments in the three States in 1934 as compared with 313 in 1933.

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[11] Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State agencies. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. While statistics of the fisheries of California are for the calendar year, those for Oregon and Washington are for the fiscal year ending Mar. 31, except that statistics of the halibut fishery in these latter States are for the calendar year. For a clearer understanding of the statistics published in this section the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

During 1934 these establishments employed 13,220 persons, paid $7,031,444 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at $41,007,888. In 1933 the wholesale and manufacturing firms employed 11,993 persons, paid $6,095,492 in salaries and wages, and produced manufactured products, valued at $28,772,185.

Fisheries of the Pacific Coast States, 1934

SUMMARY OF CATCH

Product	Washington		Oregon	
	Pounds	*Value*	*Pounds*	*Value*
Fish	105, 726, 200	$5, 580, 945	24, 118, 500	$1, 343, 440
Shellfish, etc	7, 742, 400	724, 182	2, 339, 400	113, 238
Total	113, 468, 600	6, 305, 127	26, 457, 900	1, 456, 678

Product	California		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	1, 392, 972, 100	$11, 365, 306	1, 522, 816, 800	$18, 289, 691
Shellfish, etc	9, 205, 000	731, 368	19, 286, 800	1, 568, 788
Whale products	3, 998, 400	91, 580	3, 998, 400	91, 580
Total	1, 406, 175, 500	12, 188, 254	1, 546, 102, 000	19, 950, 059

OPERATING UNITS: BY STATES

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3, 118	47	8	3, 173	39	16	55
On boats and shore	1, 915	3, 044	1, 152	6, 111	2, 068	1, 438	3, 506
Total	5, 033	3, 091	1, 160	9, 284	2, 107	1, 454	3, 561
Vessels:							
Steam	1	-----	-----	1	-----	-----	-----
Net tonnage	23	-----	-----	23	-----	-----	-----
Motor	492	21	2	515	19	8	27
Net tonnage	10, 651	156	34	10, 841	176	87	263
Sail	3	-----	-----	3	-----	-----	-----
Net tonnage	1, 346	-----	-----	1, 346	-----	-----	-----
Total vessels	496	21	2	519	19	8	27
Total net tonnage	12, 020	156	34	12, 210	176	87	263
Boats:							
Motor	854	448	602	1, 904	1, 145	954	2, 099
Other	328	180	78	586	59	131	190
Accessory boats	306	-----	-----	306	-----	-----	-----
Apparatus:							
Purse seines, salmon	227	-----	-----	227	-----	-----	-----
Length, yards	135, 746	-----	-----	135, 746	-----	-----	-----
Haul, seines	65	-----	24	89	33	3	36
Length, yards	5, 821	-----	7, 560	13, 381	17, 225	466	17, 691
Gill nets:							
Drift	298	126	394	818	871	515	1, 386
Square yards	390, 976	225, 400	1, 095, 320	1, 711, 696	2, 754, 973	630, 875	3, 885, 848
Set	3	193	96	292	137	795	932
Square yards	810	53, 259	24, 384	78, 453	38, 497	254, 400	292, 897
Lines:							
Trawl, set, and hand	25, 557	-----	309	25, 866	434	183	617
Hooks	522, 714	-----	7, 200	529, 914	12, 125	6, 425	18, 550
Troll	1, 790	540	60	2, 390	796	845	1, 641
Hooks	8, 055	2, 430	240	10, 725	3, 582	3, 802	7, 384
Pound nets	112	99	211	422	27	-----	27
Brush weirs	5	-----	-----	5	-----	-----	-----
Fish wheels	-----	-----	27	27	-----	-----	-----

Fisheries of the Pacific Coast States, 1934—Continued

OPERATING UNITS: BY STATES—Continued

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Dip nets	9	41	178	228	133	--------	133
Drag bag nets	37	6	--------	43	--------	--------	--------
Length, yards	2,959	390	--------	3,349	--------	--------	--------
Reef nets	6	--------	--------	6	--------	--------	--------
Beam trawls	8	--------	--------	8	--------	--------	--------
Yards at mouth	42	--------	--------	42	--------	--------	--------
Otter trawls	25	--------	--------	25	--------	1	1
Yards at mouth	304	--------	--------	304	--------	20	20
Traps:							
Crab	2,576	2,605	--------	5,181	--------	8,760	8,760
Crawfish	--------	--------	--------	--------	1,920	--------	1,920
Tongs, rakes, and shovels	552	2,539	--------	3,091	--------	149	149
Dredges, oyster	--------	4	--------	4	--------	--------	--------
Yards at mouth	--------	6	--------	6	--------	--------	--------

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	34	603	648	1,725	676	3,686	6,914
On boats and shore	271	937	556	723	214	2,701	12,318
Total	305	1,540	1,204	2,448	890	6,387	19,232
Vessels:							
Steam	--------	2	--------	--------	--------	2	3
Net tonnage	--------	41	--------	--------	--------	41	64
Motor	14	61	67	186	76	404	946
Net tonnage	121	1,761	1,878	7,155	4,296	15,211	26,315
Sail	--------	2	--------	--------	--------	2	5
Net tonnage	--------	824	--------	--------	--------	824	2,170
Total vessels	14	65	67	186	76	408	954
Total net tonnage	121	2,626	1,878	7,155	4,296	16,076	28,549
Boats:							
Motor	202	585	217	349	109	1,462	5,465
Other	1	38	38	50	5	132	908
Accessory boats	--------	78	89	205	72	444	750
Apparatus:							
Purse seines:							
Mackerel	--------	--------	--------	17	--------	17	17
Length, yards	--------	--------	--------	6,707	--------	6,707	6,707
Salmon	--------	--------	--------	--------	--------	--------	227
Length, yards	--------	--------	--------	--------	--------	--------	135,746
Sardine	--------	33	42	71	--------	146	146
Length, yards	--------	11,187	13,850	27,187	--------	52,224	52,224
Tuna	--------	--------	--------	66	--------	66	66
Length, yards	--------	--------	--------	38,212	--------	38,212	38,212
Lampara nets:							
Mackerel	--------	--------	--------	62	16	78	78
Length, yards	--------	--------	--------	24,686	4,813	29,499	29,499
Sardine	--------	20	32	43	8	103	103
Length, yards	--------	5,550	8,840	18,282	2,320	34,992	34,992
Other	--------	--------	23	9	--------	32	32
Length, yards	--------	--------	4,025	3,240	--------	7,265	7,265
Haul seines	--------	6	--------	--------	--------	6	131
Length, yards	--------	770	--------	--------	--------	770	31,842
Gill nets:							
Drift:							
Barracuda	--------	--------	--------	18	16	34	34
Square yards	--------	--------	--------	201,546	126,800	328,346	328,346
Salmon	--------	155	--------	--------	--------	155	2,359
Square yards	--------	534,750	--------	--------	--------	534,750	5,632,294
Shad	--------	191	--------	--------	--------	191	191
Square yards	--------	673,275	--------	--------	--------	673,275	673,275

Fisheries of the Pacific Coast States, 1934—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Apparatus—Continued.							
Gill nets—Continued.							
Set:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
"California halibut"			8			8	8
Square yards			37,826			37,826	37,826
Salmon							1,224
Square yards							371,350
Sea bass				32	14	46	46
Square yards				155,936	69,230	225,166	225,166
Miscellaneous	16	55	59	23	9	162	162
Square yards	12,000	64,543	86,065	14,522	14,360	191,490	191,490
Trammel nets				36	12	48	48
Square yards				188,784	121,120	309,904	309,904
Lines:							
Trawl, set, and hand	497	1,150	853	1,592	907	4,999	31,482
Hooks	88,086	63,032	87,646	289,456	45,620	573,840	1,122,304
Troll	1,006	870	467	724	234	3,301	7,332
Hooks	4,604	5,315	2,672	724	234	13,549	31,658
Pound nets							449
Brush weirs							5
Fish wheels							27
Fyke nets		2,075				2,075	2,075
Dip nets	30	3				33	394
Bag nets, shrimp		11				11	11
Length, yards		7,312				7,312	7,312
Drag bag nets							43
Length, yards							3,349
Reef nets							6
Paranzella nets		9	2	4		15	15
Yards at mouth		150	33	67		250	250
Beam trawls		19				19	27
Yards at mouth		127				127	169
Otter trawls							26
Yards at mouth							324
Traps:							
Crab	579	5,226	112			5,917	19,858
Crawfish							1,920
Lobster				5,172	1,348	6,520	6,520
Octopus			6			6	6
Harpoons:							
Swordfish and turtles				37	14	51	51
Whales		2				2	2
Tongs, rakes, and shovels	14	102	37	64		217	3,457
Abalone outfits			17	2		19	19
Dredges, oyster							4
Yards at mouth							6

CATCH: BY STATES

Species	Washington		Oregon	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Carp	99,600	$2,988	6,000	$180
Cod [2]	10,403,900	145,134		
Flounders:				
"Sole"	961,700	32,493	22,800	919
Other	56,500	1,220	48,300	732
Halibut	23,276,000	1,677,761	500,900	38,198
Herring	242,000	1,531	37,400	416
"Lingcod"	1,105,600	35,603	129,700	3,658
Perch	62,000	1,681	8,700	146
Rockfishes	566,400	20,041	52,900	1,494
Sablefish	2,242,800	85,286	102,400	2,991
Salmon:				
Blueback, red or sockeye	24,089,600	1,543,642	207,000	20,700
Chinook or king	17,002,600	1,190,739	12,110,000	825,416
Chum or keta	9,723,600	210,101	972,100	11,528
Humpback or pink	190,500	5,715		
Silver or coho	11,557,600	504,650	6,918,400	309,098
Shad	171,100	5,133	905,200	24,032
Smelt	2,572,400	39,161	564,200	14,112
Steelhead trout	1,371,300	77,188	1,458,900	86,959
Striped bass			23,700	1,405
Sturgeon	31,000	878	48,900	1,344
Tuna and tunalike fishes, albacore			1,000	112
Total	105,726,200	5,580,945	24,118,500	1,343,440

[2] The cod were taken off Alaska.

Fisheries of the Pacific Coast States, 1934—Continued

CATCH: BY STATES—Continued

Species	Washington		Oregon	
SHELLFISH, ETC.	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	1,124,900	$63,824	2,086,400	$85,352
Crawfish			143,600	14,360
Shrimp	59,900	4,193		
Clams:				
Hard	683,000	36,282		
Razor	547,800	78,260	38,600	5,521
Mixed			38,500	1,907
Octopus	65,700	2,193		
Oysters:				
Eastern, market	500	175		
Japanese, market	4,925,100	356,059	24,500	1,741
Native, market	317,700	179,949	7,800	4,357
Scallops, bay	12,200	3,051		
Squid	5,600	196		
Total	7,742,400	724,182	2,339,400	113,238
Grand total	113,468,600	6,305,127	26,457,900	1,456,678

Species	California[1]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	257,500	$3,722	257,500	$3,722
Barracuda	2,182,800	94,859	2,182,800	94,859
Cabrilla	331,700	13,528	331,700	13,528
Carp	158,000	2,140	263,600	5,308
Catfish	184,900	22,647	184,900	22,647
Cod[2]	6,036,400	76,100	16,440,300	221,234
Corbina	1,000	62	1,000	62
Flounders:				
"California halibut"	1,037,000	81,109	1,037,000	81,109
"Sole"	8,967,600	450,840	9,952,100	484,252
Other	1,376,700	56,691	1,481,500	58,643
Flyingfish	26,400	885	26,400	885
Grayfish	526,300	12,435	526,300	12,435
Groupers	61,400	3,076	61,400	3,076
Hake	56,900	572	56,900	572
Halibut	1,023,000	64,192	24,799,900	1,780,151
Hardhead	147,400	6,882	147,400	6,882
Herring	801,600	4,539	1,081,000	6,486
Horse mackerel	1,581,300	15,013	1,581,300	15,013
Kingfish	634,300	14,772	634,300	14,772
"Lingcod"	856,600	27,799	2,091,900	67,060
Mackerel	113,848,500	720,128	113,848,500	720,128
Marlin	64,800	2,799	64,800	2,799
Mullet	19,000	795	19,000	795
Perch	192,700	11,912	263,400	13,739
Pilchard or sardine	1,135,958,800	4,177,728	1,135,958,800	4,177,728
Pompano	4,500	1,906	4,500	1,906
Rock bass	412,400	20,697	412,400	20,697
Rockfishes	4,608,600	162,952	5,227,900	184,487
Rudderfish	32,300	1,389	32,300	1,389
Sablefish	2,105,200	56,856	4,450,400	145,133
Salmon:				
Blueback, red or sockeye			24,296,600	1,564,342
Chinook or king	4,319,600	329,571	33,432,200	2,345,726
Chum or keta			10,695,700	221,629
Humpback or pink			190,500	5,715
Silver or coho			18,476,000	813,748
Sculpin	71,200	4,432	71,200	4,432
Sea bass:				
Black	858,800	37,783	858,800	37,783
White	851,600	56,459	851,600	56,459
Shad	872,600	28,288	1,948,900	57,453
Sheepshead	143,500	4,801	143,500	4,801
Skates	232,300	2,969	232,300	2,969
Smelt	730,000	30,414	3,866,600	83,687
Spanish mackerel	6,900	225	6,900	225
Splittail	55,000	662	55,000	662
Squawfish	1,600	53	1,600	53
Steelhead trout			2,830,200	164,147
Striped bass	801,300	47,794	825,000	49,199
Sturgeon			79,900	2,222
Suckers	63,000	701	63,000	701
Swordfish	264,000	37,144	264,000	37,144
Tomcod	900	18	900	18

[1] Taken off the Pacific coast including Latin America.
[2] The cod were taken off Alaska.

Fisheries of the Pacific Coast States, 1934—Continued

CATCH: BY STATES—Continued

Species	California		Total	
	Pounds	*Value*	*Pounds*	*Value*
FISH—continued				
Tuna and tunalike fishes:				
Albacore	119, 800	$9, 203	120, 800	$9, 315
Bluefin	18, 357, 800	846, 082	18, 357, 800	846, 082
Bonito	3, 202, 700	76, 876	3, 202, 700	76, 876
Skipjack or striped tuna	14, 830, 200	593, 524	14, 830, 200	593, 524
Yellowfin	60, 913, 200	3, 053, 229	60, 913, 200	3, 053, 229
Whitebait	106, 000	5, 187	106, 000	5, 187
Whitefish	93, 200	5, 205	93, 200	5, 205
Yellowtail	2, 347, 200	79, 388	2, 347, 200	79, 388
Other fish	234, 100	6, 273	234, 100	6, 273
Total	1, 392, 972, 100	11, 365, 306	1, 522, 816, 800	18, 289, 691
SHELLFISH, ETC.				
Crabs	3, 792, 700	313, 237	7, 004, 000	462, 413
Crawfish	------	------	143, 600	14, 360
Sea crawfish or spiny lobster	1, 182, 700	180, 264	1, 182, 700	180, 264
Shrimp	1, 784, 600	27, 406	1, 844, 500	31, 599
Abalone	644, 700	104, 742	644, 700	104, 742
Clams:				
Hard	28, 600	5, 452	711, 600	41, 734
Pismo	35, 200	7, 373	35, 200	7, 373
Razor	------	------	586, 400	83, 781
Soft	71, 100	15, 639	71, 100	15, 639
Mixed	------	------	38, 500	1, 907
Octopus	30, 400	1, 964	96, 100	4, 157
Oysters:				
Eastern, market	89, 100	38, 981	89, 600	39, 156
Japanese, market	6, 700	1, 675	4, 956, 300	359, 475
Native, market	5, 000	2, 728	330, 500	187, 034
Scallops, bay	------	------	12, 200	3, 051
Squid	1, 530, 500	31, 722	1, 536, 100	31, 918
Turtles	3, 700	185	3, 700	185
Total	9, 205, 000	731, 368	19, 286, 800	1, 568, 788
WHALE PRODUCTS				
Whale meat	2, 044, 000	40, 880	2, 044, 000	40, 880
Whale oil	1, 954, 400	50, 700	1, 954, 400	50, 700
Total	3, 998, 400	91, 580	3, 998, 400	91, 580
Grand total	1, 406, 175, 500	12, 188, 254	1, 546, 102, 000	19, 950, 059

Industries related to the fisheries of the Pacific Coast States, 1934

OPERATING UNITS, SALARIES, AND WAGES

Item	Washington	Oregon	California	Total
	Number	*Number*	*Number*	*Number*
Transporting:				
Persons engaged	212	48	3	263
Vessels:				
Steam	------	------	1	1
Net tonnage	------	------	32	32
Motor	87	24	------	111
Net tonnage	2, 131	299	------	2, 430
Total vessels	87	24	1	112
Total net tonnage	2, 131	299	32	2, 462
Wholesale and manufacturing:				
Establishments	120	59	144	323
Persons engaged:				
Proprietors	90	63	205	358
Salaried employees	215	66	535	816
Wage earners:				
Average for season	3, 871	792	7, 383	12, 046
Average for year	1, 256	386	3, 417	5, 059
Paid to salaried employees	$491, 405	$168, 098	$1, 529, 979	$2, 189, 482
Paid to wage earners	$1, 234, 892	$463, 127	$3, 143, 943	$4, 841, 962
Total salaries and wages	$1, 726, 297	$631, 225	$4, 673, 922	$7, 031, 444
Fishermen manufacturing	70	------	125	195

Industries related to the fisheries of the Pacific Coast States, 1934—Continued

PRODUCTS MANUFACTURED

Item	Washington		Oregon		California	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing firms:						
Barracuda, fresh fillets ------ pounds	----------	----------	----------	----------	560, 000	$67, 200
Cabrilla, fresh fillets ------------ do	----------	----------	----------	----------	120, 000	14, 650
Cod, salted:						
Green, in process, partly boned [1] pounds	1, 904, 465	$129, 355	----------	----------	(2)	(2)
Boneless, including absolutely boneless ------------ pounds	988, 467	135, 771	----------	----------	(2)	(2)
Flounders, fresh fillets ---------- do	122, 495	13, 419	(2)	(2)	1, 807, 500	293, 875
Grayfish, fresh fillets ------------ do	----------	----------	----------	----------	130, 000	13, 000
Halibut, frozen steaks ---------- do	117, 000	16, 500	----------	----------	----------	----------
"Lingcod", fresh fillets --------- do	(2)	(2)	(2)	(2)	125, 000	15, 000
Mackerel:						
Canned ---------- standard cases	----------	----------	----------	----------	1, 250, 551	3, 087, 804
Meal ------------------------ tons	----------	----------	----------	----------	3, 323	98, 392
Oil ---------------------- gallons	----------	----------	----------	----------	157, 571	25, 533
Pilchards:						
Canned "sardines" standard cases	----------	----------	----------	----------	1, 970, 047	5, 481, 391
Meal ------------------------ tons	----------	----------	----------	----------	89, 280	2, 878, 269
Oil ---------------------- gallons	----------	----------	----------	----------	20, 845, 171	4, 413, 609
Rockfishes, fresh fillets ------ pounds	----------	----------	(2)	(2)	930, 000	119, 150
Sablefish:						
Fresh fillets ---------------- do	(2)	(2)	----------	----------	450, 000	45, 000
Salted --------------------- do	283, 806	16, 525	(2)	(2)	(2)	(2)
Kippered ------------------- do	317, 097	36, 738	----------	----------	(2)	(2)
Salmon:						
Frozen steaks --------------- do	15, 100	2, 229	----------	----------	----------	----------
Salted:						
Mild cured [1] ----------- do	3, 359, 902	629, 335	1, 595, 625	$320, 502	1, 340, 625	275, 533
Eggs for caviar ---------- do	158, 078	20, 141	----------	----------	----------	----------
Kippered ------------------- do	1, 696, 345	268, 252	(2)	(2)	----------	----------
Smoked --------------------- do	104, 667	19, 288	47, 731	11, 835	247, 118	94, 135
Canned:						
Blueback, red or sockeye standard cases	355, 169	3, 630, 745	5, 142	80, 201	----------	----------
Chinook or king -------- do	75, 050	771, 280	196, 894	2, 038, 422	----------	----------
Chum or keta ---------- do	88, 250	347, 697	26, 423	99, 799	----------	----------
Humpback or pink ---- do	2, 630	14, 343	----------	----------	----------	----------
Silver or coho --------- do	71, 867	509, 178	63, 699	560, 586	----------	----------
Steelhead trout -------- do	3, 114	19, 879	12, 968	133, 817	----------	----------
Eggs for bait ---------- do	4, 060	106, 281	984	22, 172	----------	----------
Meal ------------------------ tons	950	23, 560	(2)	(2)	----------	----------
Oil ---------------------- gallons	125, 984	19, 147	42, 754	24, 458	----------	----------
Sea bass:						
Black, fresh fillets ------- pounds	----------	----------	----------	----------	485, 000	54, 000
White, fresh fillets --------- do	----------	----------	----------	----------	120, 000	18, 900
Shad:						
Mild cured --------------- do	----------	----------	----------	----------	52, 800	3, 200
Canned ---------- standard cases	954	2, 767	7, 279	21, 691	----------	----------
Roe, canned --------------- do	(2)	(2)	1, 500	42, 750	(2)	(2)
Sheepshead, fresh fillets ----- pounds	----------	----------	----------	----------	44, 000	6, 180
Swordfish, fresh fillets --------- do	----------	----------	----------	----------	110, 000	32, 400
Tuna and tunalike fishes:						
Canned:						
Albacore ----- standard cases	----------	----------	----------	----------	90, 599	512, 319
Bluefin --------------- do	----------	----------	----------	----------	312, 198	1, 420, 733
Bonito --------------- do	----------	----------	----------	----------	58, 083	234, 598
Striped --------------- do	----------	----------	----------	----------	226, 359	1, 034, 799
"Tonno" ------------- do	----------	----------	----------	----------	167, 484	1, 082, 318
Yellowfin ------------- do	----------	----------	----------	----------	1, 100, 772	5, 680, 503
Yellowtail ------------ do	----------	----------	----------	----------	11, 448	44, 272
Meal ------------------------ tons	----------	----------	----------	----------	6, 705	191, 015
Totuava, fresh fillets -------- pounds	----------	----------	----------	----------	365, 000	54, 750
Crabs, meat, packaged, fresh cooked pounds	153, 690	57, 497	267, 624	77, 754	----------	----------
Lobsters, meat, packaged, fresh cooked ------------------ pounds	----------	----------	----------	----------	860, 000	221, 000
Abalone steaks ---------------- do	----------	----------	----------	----------	627, 300	183, 990
Clams, hard:						
Fresh shucked ----------- gallons	2, 849	3, 311	(2)	(2)	----------	----------
Canned:						
Whole ------- standard cases	12, 977	52, 361	----------	----------	----------	----------
Minced ---------------- do	9, 685	40, 542	----------	----------	----------	----------
Juice ----------------- do	2, 322	4, 793	----------	----------	----------	----------
Shells, crushed for poultry feed tons	1, 735	16, 662	----------	----------	----------	----------

See footnotes at end of table.

Industries related to the fisheries of the Pacific Coast States, 1934—Continued

PRODUCTS MANUFACTURED—Continued

Item	Washington		Oregon		California	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing firms—Continued.						
Clams, razor:						
Canned:						
Whole……standard cases	558	$5, 064	--------	--------	--------	--------
Minced……do	23, 068	198, 624	654	$4, 617	--------	--------
Oysters:						
Japanese:						
Fresh shucked……gallons	219, 637	281, 782	44, 966	69, 594	(2)	(2)
Canned……standard cases	68, 497	317, 887	(2)	(2)	--------	--------
Native, fresh shucked……gallons	23, 967	137, 061	7, 796	47, 352	(2)	(2)
Shell products, poultry feed……tons	(2)	(2)	(2)	(2)	16, 215	$85, 589
Unclassified:						
Packaged……pounds	[3] 87, 200	[3] 15, 757	[4] 20, 625	[4] 3, 000	[5] 396, 332	[5] 97, 050
Salted……do	(6)	(6)	(6)	(6)	[7] 1,417, 562	[7] 119, 744
Smoked……do	(6)	(6)	[8] 26, 579	[8] 4, 828	[9] 391, 735	[9] 67, 037
Canned, cat and dog food……standard cases	--------	--------	--------	--------	287, 752	795, 590
Canned, other……do	[10] 1, 178	[10] 5, 110	(6)	(6)	[11] 3, 576	[11] 31, 483
Meal and scrap……tons	(6)	(6)	(6)	(6)	[12] 2, 018	[12] 52, 571
Oil……gallons	(6)	(6)	--------	--------	[13] 315, 346	[13] 66, 360
Miscellaneous……	--------	[14] 111, 887	--------	[15] 22, 776	--------	[16] 428, 024
Total……	--------	7, 980, 768	--------	3, 586, 154	--------	29, 440, 966
By fishermen:						
Cod, green salted……pounds	3, 225, 216	145, 134	--------	--------	1, 870, 485	74, 800
Cod, tongues……do	--------	--------	--------	--------	2, 600	130
Shrimp:						
Dried……do	--------	--------	--------	--------	90, 301	13, 545
Meal or bran……do	--------	--------	--------	--------	194, 000	1, 940
Total……	2, 225, 216	145, 134	--------	--------	2, 157, 386	90, 415
Grand total……	--------	8, 125, 902	--------	3, 586, 154	--------	29, 531, 381

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[1] This item is usually an intermediate product and although included in the total, may be shown in its final stage of processing in this or another State.

[2] The production of this item has been included under "Unclassified products."

[3] Includes fresh fillets of "lingcod" and sablefish; frozen fillets of flounders; fresh halibut cheeks; packaged cooked and peeled shrimp; and fresh-shucked bay scallops.

[4] Includes fresh fillets of flounders, "lingcod", and rockfishes; and fresh-shucked hard clams.

[5] Includes packaged cooked and peeled shrimp; and fresh-shucked Eastern, Japanese, and native oysters.

[6] This item has been included under "Miscellaneous."

[7] Includes salted barracuda, herring, mackerel, pilchards, sablefish, yellowtail, and black and white sea bass; boneless salt cod; and green salt cod in process, partly boned.

[8] Includes smoked shad and smelt, and kippered salmon and sturgeon.

[9] Includes smoked bonito, chubs, herring, mackerel, and yellowtail; and kippered sablefish.

[10] Includes canned herring for bait; shad roe; sturgeon caviar; hard clam chowder, cocktail, and nectar; and razor clam juice.

[11] Includes canned fish chowder, gefilte fish, shad roe, squid, and tuna cocktail.

[12] Includes shrimp meal or bran and miscellaneous fish meal.

[13] Includes tuna, whale, sperm, and miscellaneous oil.

[14] Includes kippered herring and herring bloaters; spiced herring; salted salmon bellies; salmon-egg meal; crushed oyster shell for poultry feed; and miscellaneous liver oil.

[15] Includes salted sablefish; canned crabs and Japanese oysters; salmon and salmon-egg meal; crushed oyster shell for poultry feed; and marine-shell novelties.

[16] Includes oyster-shell lime; marine-shell novelties; liquid glue; and kelp products.

NOTE.—The total value of manufactured products in the Pacific Coast States was as follows: By manufacturing establishments, $41,007,888; and by fishermen, $235,549. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. All of the persons engaged in the preparation of fishermen's manufactured products have also been included as fishermen.

WASHINGTON

Fisheries of Washington, 1934

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Carp					99,600	$2,988
Cod [1]	10,403,900	$145,134				
Flounders:						
"Sole"	954,600	32,261			7,100	232
Other	56,500	1,220				
Halibut	23,181,200	1,669,796	3,800	$232	91,000	7,733
Herring	242,000	1,531				
"Lingcod"	1,067,700	34,563	28,700	772	9,200	268
Perch	62,000	1,681				
Rockfishes	540,100	19,488	20,100	402	6,200	151
Sablefish	2,235,400	85,050			7,400	236
Salmon:						
Blueback, red or sockeye	23,530,600	1,491,629	349,800	31,093	209,200	20,920
Chinook or king	7,591,600	568,654	1,574,100	88,425	7,836,900	533,660
Chum or keta	7,732,400	181,559	1,359,300	20,390	631,900	8,152
Humpback or pink	190,500	5,715				
Silver or coho	8,243,100	358,864	2,211,500	96,407	1,103,000	49,379
Shad					171,100	5,133
Smelt	283,600	13,471	89,700	3,588	2,199,100	22,102
Steelhead trout			54,700	2,406	1,316,600	74,782
Sturgeon					31,000	878
Total	86,315,200	4,610,616	5,691,700	243,715	13,719,300	726,614
SHELLFISH						
Crabs	281,200	15,888	843,700	47,936		
Shrimp	59,900	4,193				
Squid	5,600	196				
Clams:						
Hard:						
Butter	309,200	15,053				
Little neck	373,800	21,229				
Razor			547,800	78,260		
Octopus	65,700	2,193				
Oysters:						
Eastern, market			500	175		
Japanese, market	1,425,300	88,081	3,499,800	267,978		
Native market	308,900	176,077	8,800	3,872		
Scallops, bay	12,200	3,051				
Total	2,841,800	325,961	4,900,600	398,221		
Grand total	89,157,000	4,936,577	10,592,300	641,936	13,719,300	726,614

[1] The cod were taken off Alaska.

Fisheries of the Puget Sound district of Washington, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines	Haul seines	Gill nets		Lines		Pound nets	Brush weirs
			Drift	Set	Trawl, set, and hand	Troll		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen;								
On vessels	1,776	18			1,172	195	19	
On boats and shore	21	202	308	3	88	336	238	10
Total	1,797	220	308	3	1,260	531	257	10
Vessels:								
Motor	223	5			150	111	7	
Net tonnage	5,179	44			4,276	953	120	
Sail					3			
Net tonnage					1,346			
Total vessels	223	5			153	111	7	
Total net tonnage	5,179	44			5,622	953	120	
Boats:								
Motor	4	45	296	3	83	247	25	
Other		20	2		35		112	5
Accessory boats	227				79			
Apparatus:								
Number	227	65	298	3	25,557	1,790	112	5
Length, yards	135,746	5,821						
Square yards			390,976	810				
Hooks					522,714	8,055		

Fisheries of the Puget Sound district of Washington, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dip nets	Drag bag nets	Reef nets	Beam trawls	Otter trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen;									
On vessels				18	40				3, 118
On boats and shore	9	100	24	4	18	92	242	392	1, 915
Total	9	100	24	22	58	92	242	392	5, 033
Vessels:									
Steam				1					1
Net tonnage				23					23
Motor				5	16				492
Net tonnage				48	249				10, 651
Sail									3
Net tonnage									1, 346
Total vessels				6	16				496
Total net tonnage				71	249				12, 020
Boats:									
Motor	6	32	6	2	9	88	40		854
Other	3	11	12			4	128		328
Accessory boats									306
Apparatus:									
Number	9	37	6	8	25	2, 576	160	392	
Length, yards		2, 959							
Yards at mouth				42	304				

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"			1, 600	$54			100	$3
Other			5, 700	123				
Herring			2, 100	21				
"Lingcod"							3, 400	102
Perch			43, 800	1, 205				
Rockfishes			4, 300	119			100	3
Salmon:[3]								
Blueback, red or sockeye	14, 086, 500	$892, 810	9, 600	672	33, 800	$2, 143	2, 600	165
Chinook or king	461, 800	20, 991	5, 200	423	434, 700	27, 343		
Chum or keta	6, 783, 600	158, 764			362, 900	9, 072		
Humpback or pink	150, 700	4, 522			300	9		
Silver or coho	4, 500, 600	157, 523	200	10	327, 500	15, 851		
Smelt			170, 000	8, 075				
Total	25, 983, 200	1, 234, 610	242, 500	10, 702	1, 159, 200	54, 418	6, 200	273
SHELLFISH								
Squid			5, 300	185				
Grand total	25, 983, 200	1, 234, 610	247, 800	10, 887	1, 159, 200	54, 418	6, 200	273

Species	Lines				Pound nets		Brush weirs	
	Trawl, set, and hand[1]		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod[2]	10, 403, 900	$145, 134						
Flounders, "sole"	700	20						
Halibut	23, 144, 000	1, 667, 085	35, 100	$2, 580				
Herring							236, 400	$1, 466
"Lingcod"	796, 400	27, 097	34, 500	759				
Perch	900	31						
Rockfishes	426, 400	16, 389	3, 800	76				
Sablefish	2, 235, 200	85, 043						

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[1] In addition, the vessels in the Pacific coast halibut fleet landed about 540,000 pounds of halibut, sablefish, and "lingcod" livers at Seattle, which were valued at $111,000.

[2] The cod were taken off Alaska.

Fisheries of the Puget Sound district of Washington, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Brush weirs	
	Trawl, set, and hand		Troll					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:[3]								
Blueback, red or sockeye					9,388,300	$595,218		
Chinook or king			2,963,700	$251,618	3,725,300	268,222		
Chum or keta					577,700	13,518		
Humpback or pink			200	6	39,300	1,178		
Silver or coho			2,196,100	126,495	1,213,800	58,748		
Total	37,007,500	$1,940,799	5,233,400	381,534	14,944,400	936,884	236,400	$1,466
SHELLFISH								
Octopus	64,900	2,165						
Grand total	37,072,400	1,942,964	5,233,400	381,534	14,944,400	936,884	236,400	1,466

Species	Dip nets		Drag bag nets		Reef nets		Beam trawls	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Herring	3,400	$43	100	$1				
Perch			12,800	329				
Rockfishes			400	11				
Salmon:[3]								
Blueback, red or sockeye					9,800	$621		
Chinook or king					900	57		
Chum or keta					8,200	205		
Silver or coho					4,900	237		
Smelt			113,600	5,396				
Total	3,400	43	126,900	5,737	23,800	1,120		
SHELLFISH								
Shrimp							59,900	$4,193
Squid			300	11				
Scallops, bay[7]							12,200	3,051
Total			300	11			72,100	7,244
Grand total	3,400	43	127,200	5,748	23,800	1,120	72,100	7,244

Species	Otter trawls		Traps, crab		Tongs and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"	952,200	$32,184						
Other	50,800	1,097						
Halibut	2,100	131						
"Lingcod"	233,400	6,605						
Perch	4,500	116						
Rockfishes	105,100	2,890						
Sablefish	200	7						
Total	1,348,300	43,030						
SHELLFISH								
Crabs[4]			281,200	$15,888				
Clams, hard:[5]								
Butter							309,200	$15,053
Little neck							373,800	21,229
Octopus	800	28						
Oysters:[6]								
Japanese, market					1,425,300	$88,081		
Native, market					308,900	176,077		
Total	800	28	281,200	15,888	1,734,200	264,158	683,000	36,282
Grand total	1,349,100	43,058	281,200	15,888	1,734,200	264,158	683,000	36,282

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[3] Statistics of the catch of salmon except those taken by troll lines are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback, red or sockeye 7.1 pounds; chinook or king 22 pounds; chum or keta 10 pounds, for all gear, except purse seines, for which a factor of 9.4 pounds was used; humpback or pink 5 pounds; and silver or coho 8 pounds.

[4] The weight of crabs shown is based on an average of 20 pounds per dozen.

[5] Statistics on hard clams as used in this table are based on yields of 28 percent edible meats for butter clams and 24 percent for little neck clams.

[6] Statistics on oysters are based on yields of 16 percent edible meats for native oysters and 14 percent for Japanese oysters.

[7] The weight of bay scallops is based on a yield of 15 percent edible meat.

Fisheries of the coastal district of Washington, 1934

OPERATING UNITS: BY GEAR

Item	Gill nets		Lines, troll	Pound nets	Dip nets	Drag bag nets	Traps, crab	Tongs and rakes	Dredges	Shovels	Total, exclusive of duplication
	Drift	Set									
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels			21				18		8		47
On boats and shore	140	173	136	60	41	36	76	220		2,394	3,044
Total	140	173	157	60	41	36	94	220	8	2,394	3,091
Vessels:											
Motor			12				9		2		21
Net tonnage			93				68		13		156
Boats:											
Motor	126	92	96	43			49	46			448
Other		39		32		6		105			180
Apparatus:											
Number	126	193	540	99	41	6	2,605	145	4	2,394	
Length, yards						390					
Square yards	225,400	53,259									
Yards at mouth									6		
Hooks			2,430								

CATCH: BY GEAR

Species	Gill nets				Lines, troll	
	Drift		Set			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut					3,800	$232
"Lingcod"					28,700	772
Rockfishes					20,100	402
Salmon:[1]						
Blueback, red or sockeye			336,500	$29,914		
Chinook or king	394,000	$13,790	223,400	7,819	723,000	58,636
Chum or keta	192,200	2,883	333,400	5,001		
Silver or coho	385,300	13,486	405,900	14,206	883,800	49,937
Steelhead trout			54,700	2,406		
Total	971,500	30,159	1,353,900	59,346	1,659,400	109,979

Species	Pound nets		Dip nets		Drag bag nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:[1]						
Blueback, red or sockeye			13,300	$1,179		
Chinook or king	233,700	$8,180				
Chum or keta	833,700	12,506				
Silver or coho	536,500	18,778				
Smelt			29,700	1,188	60,000	$2,400
Total	1,603,900	39,464	43,000	2,367	60,000	2,400

Species	Traps, crab		Dredges, tongs, and rakes		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs[2]	843,700	$47,936				
Clams, razor[3]					547,800	$78,260
Oysters:[4]						
Eastern, market			500	$175		
Japanese, market			3,499,800	267,978		
Native, market			8,800	3,872		
Total	843,700	47,936	3,509,100	272,025	547,800	78,260

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[1] Statistics of the catch of salmon except those taken by troll lines are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback, red or sockeye, 4.5 pounds; chinook or king, 22 pounds; chum or keta, 10 pounds; silver or coho, 10 pounds; and steelhead trout, 10 pounds.

[2] The weight of crabs as shown in this table is based on an average of 22 pounds per dozen.

[3] The weight of razor clams shown is based on a yield of 42 percent edible meats.

[4] The statistics on oysters used in this table are based on yields of 14 percent edible meats for Japanese and native oysters, and 13 percent for eastern oysters.

Fisheries of the Columbia River district of Washington, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Fish wheels	Dip nets	Total, exclusive of duplication
		Drift	Set	Trawl and set	Troll				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels				8					8
On boats and shore	264	548	45	9	22	188	20	178	1,152
Total	264	548	45	17	22	188	20	178	1,160
Vessels:									
Motor				2					2
Net tonnage				34					34
Boats:									
Motor	16	394	38	9	15	94		88	602
Other	24		7			43		6	78
Apparatus:									
Number	24	394	96	309	60	211	27	178	
Length, yards	7,560								
Square yards		1,095,320	24,384						
Hooks				7,200	240				

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines, trawl and set	
			Drift		Set			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	99,600	$2,988						
Flounders, "sole"							7,100	$232
Halibut							91,000	7,733
"Lingcod"							9,200	268
Rockfishes							6,200	151
Sablefish							7,400	236
Salmon:								
Blueback, red or sockeye	31,600	3,160	26,400	$2,640	1,400	$140		
Chinook or king	1,843,400	126,642	3,005,700	206,492	53,100	2,920		
Chum or keta	1,000	13	406,200	5,240	21,900	283		
Silver or coho	20,300	792	448,900	19,931	8,100	300		
Shad	55,600	1,668	43,100	1,293	100	3		
Smelt			205,000	6,150				
Steelhead trout	214,300	11,786	268,400	15,433	2,600	147		
Sturgeon	1,000	17	11,500	315	2,300	72	2,100	63
Total	2,266,800	147,066	4,415,200	257,494	89,500	3,865	123,000	8,683

Species	Lines, troll		Pound nets		Fish wheels		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Blueback, red or sockeye			49,400	$4,940	81,600	$8,160	18,800	$1,880
Chinook or king	30,200	$2,658	2,515,600	172,822	195,200	13,410	193,700	8,716
Chum or keta			202,200	2,608			600	8
Silver or coho	103,200	5,366	522,500	22,990				
Shad			68,100	2,043	4,200	126		
Smelt							1,994,100	15,952
Steelhead trout	200	12	767,200	44,114	30,900	1,591	33,000	1,699
Sturgeon			5,500	153	8,600	258		
Total	133,600	8,036	4,130,500	249,670	320,500	23,545	2,240,200	28,255

OREGON

Fisheries of Oregon, 1934

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Carp	6,000	$180		
Flounders:				
"Sole"	19,100	835	3,700	$84
Other	300	18	48,000	714
Halibut	382,000	29,729	118,900	8,469
Herring			37,400	416
"Lingcod"	62,600	2,326	67,100	1,332
Perch			8,700	146
Rockfishes	34,800	1,025	18,100	469
Sablefish	78,600	2,408	23,800	583
Salmon:				
Blueback, red or sockeye	207,000	20,700		
Chinook or king	10,820,400	747,453	1,289,600	77,963
Chum or keta	542,200	7,015	429,900	4,513
Silver or coho	2,427,300	120,738	4,491,100	188,360
Shad	488,500	14,655	416,700	9,377
Smelt	564,000	14,100	200	12
Steelhead trout	1,168,200	65,858	290,700	21,101
Striped bass			23,700	1,405
Sturgeon	48,100	1,318	800	26
Tuna, albacore	500	62	500	50
Total	16,849,600	1,028,420	7,268,900	315,020
SHELLFISH				
Crabs			2,086,400	85,352
Crawfish	143,600	14,360		
Clams:				
Razor			38,600	5,521
Mixed			38,500	1,907
Oysters:				
Japanese, market			24,500	1,741
Native, market			7,800	4,357
Total	143,600	14,360	2,195,800	98,878
Grand total	16,993,200	1,042,780	9,464,700	413,898

Fisheries of the Columbia River district of Oregon, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Traps, crawfish	Total, exclusive of duplication
		Drift	Set	Trawl and set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				11	28				39
On boats and shore	455	1,180	68	40	175	30	133	32	2,068
Total	455	1,180	68	51	203	30	133	32	2,107
Vessels:									
Motor				3	16				19
Net tonnage				48	128				176
Boats:									
Motor	18	871	56	37	144	15	5	25	1,145
Other	33		12	3		7		7	59
Apparatus:									
Number	33	871	137	434	796	27	133	1,920	
Length, yards	17,255								
Square yards		2,754,973	38,497						
Hooks				12,125	3,582				

Fisheries of the Columbia River district of Oregon, 1934—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines	
			Drift		Set		Trawl and set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	6,000	$180						
Flounders:								
"Sole"							19,100	$835
Other							300	18
Halibut							382,000	29,729
"Lingcod"							62,600	2,326
Rockfishes							34,800	1,025
Sablefish							78,600	2,408
Salmon:								
Blueback, red or sockeye	57,900	5,790	133,700	$13,370	4,400	$440		
Chinook, or king	1,850,400	127,122	7,787,300	534,987	37,700	2,074		
Chum or keta	22,100	285	488,600	6,303	10,100	130		
Silver or coho	67,800	2,644	400,400	17,778	4,700	174		
Shad	261,400	7,842	226,600	6,798				
Smelt			564,000	14,100				
Steelhead trout	429,500	23,622	459,900	26,344	14,900	843		
Sturgeon	700	19	22,800	625	4,500	123	18,400	504
Tuna, albacore							500	62
Total	2,695,800	167,504	10,083,300	620,305	76,300	3,784	596,300	36,907

Species	Lines—Continued		Pound nets		Dip nets		Traps, crawfish	
	Troll							
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Blueback, red or sockeye			7,000	$700	4,000	$400		
Chinook, or king	504,400	$44,387	424,300	29,149	216,300	9,734		
Chum or keta			21,400	297				
Silver or coho	1,768,500	91,962	185,900	8,180				
Shad			500	15				
Steelhead trout	600	35	199,200	11,713	64,100	3,301		
Sturgeon	100	3	400	11	1,200	33		
Total	2,273,600	136,387	838,700	50,065	285,600	13,468		
SHELLFISH								
Crawfish, fresh water							143,600	$14,360
Grand total	2,273,600	136,387	838,700	50,065	285,600	13,468	143,600	14,360

Fisheries of the coastal district of Oregon, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Otter trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
		Drift	Set	Trawl and set	Troll					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				5	11	3				16
On boats and shore	10	515	330	32	162		292	13	136	1,438
Total	10	515	330	37	173	3	292	13	136	1,454
Vessels:										
Motor				1	7	1				8
Net tonnage				16	71	16				87
Boats:										
Motor	3	473	204	26	121		275	4		954
Other	3		120	6			17	9		131
Apparatus:										
Number	3	515	795	183	845	1	8,760	13	136	
Length, yards	466									
Square yards		630,875	254,400							
Yards at mouth						20				
Hooks				6,425	3,802					

Fisheries of the coastal district of Oregon, 1934—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Trawl and set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders.								
"Sole"	------	------	------	------	2, 500	$63	500	$10
Other	20, 100	$302	3, 600	$36	13, 700	213	------	------
Halibut	------	------	------	------	109, 100	7, 798	9, 200	632
Herring	12, 400	166	25, 000	250	------	------	------	------
"Lingcod"	------	------	------	------	29, 400	600	35, 300	642
Perch	6, 000	95	2, 700	51	------	------	------	------
Rockfishes	------	------	------	------	14, 900	391	3, 100	75
Sablefish	------	------	------	------	23, 800	583	------	------
Salmon:								
Chinook or king	------	------	1, 076, 400	59, 203	------	------	213, 200	18, 760
Chum or keta	------	------	429, 900	4, 513	------	------	------	------
Silver or coho	------	------	2, 657, 300	93, 004	------	------	1, 833, 800	95, 356
Shad	------	------	416, 700	9, 377	------	------	------	------
Smelt	------	------	200	12	------	------	------	------
Steelhead trout	------	------	290, 700	21, 101	------	------	------	------
Striped bass	------	------	23, 700	1, 405	------	------	------	------
Sturgeon	------	------	800	26	------	------	------	------
Tuna, albacore	------	------	------	------	------	------	500	50
Total	38, 500	563	4, 927, 000	188, 978	193, 400	9, 648	2, 095, 600	115, 525

Species	Otter trawls		Traps, crab		Tongs and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"	700	$11	------	------	------	------	------	------
Other	10, 600	163	------	------	------	------	------	------
Halibut	600	39	------	------	------	------	------	------
"Lingcod"	2, 400	90	------	------	------	------	------	------
Rockfishes	100	3	------	------	------	------	------	------
Total	14, 400	306	------	------	------	------	------	------
SHELLFISH								
Crabs	------	------	2, 086, 400	$85, 352	------	------	------	------
Clams:								
Razor [1]	------	------	------	------	------	------	38, 600	$5, 521
Mixed [2]	------	------	------	------	------	------	38, 500	1, 907
Oysters:								
Japanese, market	------	------	------	------	24, 500	$1, 741	------	------
Native, market	------	------	------	------	7, 800	4, 357	------	------
Total	------	------	2, 086, 400	85, 352	32, 300	6, 098	77, 100	7, 428
Grand total	14, 400	306	2, 086, 400	85, 352	32, 300	6, 098	77, 100	7, 428

[1] Statistics on razor clams used in this table show the quantity of edible meats based on 42 percent of the round weight.

[2] Mixed clams consist principally of eastern soft-shelled clams. The quantity shown is that of the edible meats and equals 21 percent of the round weight.

CALIFORNIA

Fisheries of California, 1934

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district [1]		Monterey district	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Anchovies	----------	----------	67, 000	$1, 004	127, 400	$1, 930
Carp	----------	----------	158, 000	2, 140	----------	----------
Catfish	----------	----------	184, 900	22, 647	----------	----------
Cod [1]	----------	----------	6, 036, 400	76, 100	----------	----------
Flounders:						
"California halibut"	----------	----------	28, 100	2, 352	35, 900	2, 665
"Sole"	3, 219, 900	$160, 995	4, 293, 100	243, 449	934, 800	31, 138
Other	488, 600	16, 981	716, 800	31, 737	156, 300	5, 845
Flyingfish	----------	----------	----------	----------	----------	----------
Grayfish	4, 100	41	96, 600	966	6, 100	61
Groupers	----------	----------	----------	----------	----------	----------
Hake	800	8	48, 200	482	7, 700	77
Halibut	1, 023, 000	64, 192	----------	----------	----------	----------
Hardhead	----------	----------	147, 400	6, 882	----------	----------
Herring	3, 500	26	755, 700	4, 087	11, 200	112
Horse mackerel	----------	----------	----------	----------	138, 500	3, 011
Kingfish	----------	----------	14, 000	421	244, 200	7, 699
"Lingcod"	430, 800	11, 090	323, 900	12, 048	100, 300	4, 615
Mackerel	----------	----------	3, 700	111	5, 123, 900	41, 298
Perch	5, 600	152	113, 500	7, 945	29, 500	1, 136
Pilchard or sardine	----------	----------	367, 800, 800	1, 359, 138	478, 923, 400	1, 774, 968
Pompano	----------	----------	----------	----------	100	53
Rockfishes	400, 300	10, 152	544, 200	24, 644	1, 775, 200	55, 921
Sablefish	794, 600	23, 664	158, 400	3, 961	506, 100	9, 369
Salmon	2, 769, 300	211, 539	1, 264, 100	89, 203	286, 200	28, 829
Sculpin	----------	----------	800	8	4, 400	45
Sea bass, white	----------	----------	300	28	2, 400	260
Shad	----------	----------	872, 600	28, 288	----------	----------
Skates	5, 500	68	168, 300	2, 103	39, 600	485
Smelt	28, 900	965	266, 600	13, 050	162, 700	6, 893
Splittail	----------	----------	55, 000	662	----------	----------
Squawfish	----------	----------	1, 600	53	----------	----------
Striped bass	----------	----------	801, 300	47, 794	----------	----------
Suckers	----------	----------	63, 000	701	----------	----------
Tomcod	300	6	600	12	----------	----------
Tuna, albacore	----------	----------	----------	----------	800	60
Whitebait	76, 000	3, 424	10, 700	534	19, 300	1, 229
Other fish	111, 000	2, 463	90, 200	2, 254	23, 000	1, 221
Total	9, 362, 200	505, 766	385, 085, 800	1, 984, 804	488, 659, 000	1, 978, 920
SHELLFISH						
Crabs	110, 800	7, 053	3, 421, 800	293, 593	235, 500	11, 798
Shrimp	----------	----------	1, 783, 700	27, 222	900	184
Abalone	----------	----------	----------	----------	557, 400	95, 914
Clams:						
Hard	9, 900	903	14, 600	3, 595	----------	----------
Pismo	----------	----------	----------	----------	4, 800	1, 088
Soft	100	11	71, 000	15, 628	----------	----------
Octopus	700	35	10, 600	471	19, 000	1, 443
Oysters, market:						
Eastern	----------	----------	89, 100	38, 981	----------	----------
Japanese	----------	----------	----------	----------	6, 700	1, 675
Native	----------	----------	5, 000	2, 728	----------	----------
Squid	----------	----------	----------	----------	1, 486, 400	30, 673
Total	121, 500	8, 002	5, 395, 800	382, 218	2, 310, 700	142, 775
WHALE PRODUCTS						
Whale meat	----------	----------	2, 044, 000	40, 880	----------	----------
Whale oil	----------	----------	1, 954, 400	50, 700	----------	----------
Total	----------	----------	3, 998, 400	91, 580	----------	----------
Grand total	9, 483, 700	513, 768	394, 480, 000	2, 458, 602	490, 969, 700	2, 121, 695

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[1] The catch of cod was taken off Alaska.

NOTE.—The catch of pilchard includes 232,322,700 pounds, valued at $858,274, which were delivered to floating reduction plants. The catch in previous years delivered to these plants was not included.

Fisheries of California, 1934—Continued

CATCH: BY DISTRICTS—Continued

Species	San Pedro district					
	Off California		Off Latin America		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Anchovies	63, 100	$788			63, 100	$788
Barracuda	1, 575, 800	57, 275	143, 000	$12, 142	1, 718, 800	69, 417
Cabrilla			168, 200	7, 077	168, 200	7, 077
Corbina			1, 000	62	1, 000	62
Flounders:						
"California halibut"	531, 500	44, 382	102, 200	7, 750	633, 700	52, 132
"Sole"	517, 400	15, 052			517, 400	15, 052
Other	15, 000	2, 128			15, 000	2, 128
Flyingfish	26, 400	885			26, 400	885
Grayfish	384, 800	11, 080	1, 100	32	385, 900	11, 112
Groupers			39, 900	2, 075	39, 900	2, 075
Hake	200	5			200	5
Herring	400	20			400	20
Horse mackerel	1, 441, 200	11, 986			1, 441, 200	11, 986
Kingfish	371, 500	6, 542			371, 500	6, 542
"Lingcod"	1, 500	43	100	3	1, 600	46
Mackerel	97, 151, 900	616, 543			97, 151, 900	616, 543
Marlin	19, 900	984	100	4	20, 000	988
Mullet	3, 700	175	1, 000	29	4, 700	204
Perch	43, 300	2, 656			43, 300	2, 656
Pilchard or sardine	285, 180, 800	1, 030, 282			285, 180, 800	1, 030, 282
Pompano	4, 400	1, 853			4, 400	1, 853
Rock bass	216, 100	12, 388	25, 100	1, 421	241, 200	13, 809
Rockfishes	1, 406, 500	52, 731	14, 100	535	1, 420, 600	53, 266
Rudderfishes	32, 300	1, 389			32, 300	1, 389
Sablefish	643, 700	19, 817			643, 700	19, 817
Sculpin	58, 600	4, 020			58, 600	4, 020
Sea bass:						
Black	17, 600	794	475, 200	22, 164	492, 800	22, 958
White	400, 700	24, 801	122, 800	9, 100	523, 500	33, 901
Sheepshead	137, 500	4, 601	200	7	137, 700	4, 608
Skates	14, 500	268			14, 500	268
Smelt	242, 100	8, 451	100	4	242, 200	8, 455
Spanish mackerel			3, 200	152	3, 200	152
Swordfish	193, 100	28, 050			193, 100	28, 050
Tuna and tunalike fishes:						
Albacore	119, 000	9, 143			119, 000	9, 143
Bluefin	17, 940, 200	826, 288	16, 500	1, 262	17, 956, 700	827, 550
Bonito	2, 001, 000	49, 768	34, 300	931	2, 035, 300	50, 699
Skipjack or striped tuna			3, 808, 900	152, 481	3, 808, 900	152, 481
Yellowfin	200	14	19, 451, 800	974, 688	19, 452, 000	974, 702
Whitefish	31, 800	2, 197	18, 100	910	49, 900	3, 107
Yellowtail	126, 500	5, 582	1, 022, 100	40, 798	1, 148, 600	46, 380
Other fish	8, 800	282	1, 100	53	9, 900	335
Total	410, 923, 000	2, 853, 263	25, 450, 100	1, 233, 680	436, 373, 100	4, 086, 943
SHELLFISH						
Crabs	24, 600	793			24, 600	793
Sea crawfish or spiny lobster	295, 900	47, 238	111, 100	21, 001	407, 000	68, 239
Abalone	87, 300	8, 828			87, 300	8, 828
Clams:						
Hard	4, 100	954			4, 100	954
Pismo	30, 400	6, 285			30, 400	6, 285
Octopus	100	15			100	15
Squid	39, 700	921			39, 700	921
Turtles			300	23	300	23
Total	482, 100	65, 034	111, 400	21, 024	593, 500	86, 058
Grand total	411, 405, 100	2, 918, 297	25, 561, 500	1, 254, 704	436, 966, 600	4, 173, 001

Fisheries of California, 1934—Continued

CATCH: BY DISTRICTS—Continued

Species	San Diego district					
	Off California		Off Latin America		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Barracuda	225,400	$9,637	238,600	$15,805	464,000	$25,442
Cabrilla			163,500	6,451	163,500	6,451
Flounders:						
"California halibut"	53,000	3,460	286,300	20,500	339,300	23,960
"Sole"	2,400	206			2,400	206
Grayfish	29,000	207	4,600	48	33,600	255
Groupers			21,500	1,001	21,500	1,001
Herring	28,100	273	2,700	21	30,800	294
Horse mackerel	1,600	16			1,600	16
Kingfish	4,600	110			4,600	110
Mackerel	11,302,800	60,640	266,200	1,536	11,569,000	62,176
Marlin	41,400	1,669	3,400	142	44,800	1,811
Mullet	14,300	591			14,300	591
Perch	500	17	300	6	800	23
Pilchard or sardine	4,051,300	13,301	2,500	39	4,053,800	13,340
Rock bass	115,400	4,944	55,800	1,944	171,200	6,888
Rockfishes	285,600	10,901	182,700	8,068	468,300	18,969
Sablefish	1,300	22	1,100	23	2,400	45
Sculpin	7,400	359			7,400	359
Sea bass:						
Black	36,100	931	329,900	13,894	366,000	14,825
White	65,300	4,094	260,100	18,176	325,400	22,270
Sheepshead	4,300	152	1,500	41	5,800	193
Skates	4,400	45			4,400	45
Smelt	28,300	980	1,300	71	29,600	1,051
Spanish mackerel			3,700	73	3,700	73
Swordfish	64,800	8,262	6,100	832	70,900	9,094
Tuna and tunalike fishes:						
Bluefin	351,500	16,214	49,600	2,318	401,100	18,532
Bonito	1,002,000	22,464	165,400	3,713	1,167,400	26,177
Skipjack or striped tuna			11,021,300	441,043	11,021,300	441,043
Yellowfin	19,300	970	41,441,900	2,077,557	41,461,200	2,078,52
Whitefish	15,900	734	27,400	1,364	43,300	2,098
Yellowtail	84,100	2,192	1,114,500	30,816	1,198,600	33,008
Total	17,840,100	163,391	55,651,900	2,645,482	73,492,000	2,808,873
SHELLFISH						
Sea crawfish or spiny lobster	70,700	11,111	705,000	100,914	775,700	112,025
Squid	4,400	128			4,400	128
Turtles			3,400	162	3,400	162
Total	75,100	11,239	708,400	101,076	783,500	112,315
Grand total	17,915,200	174,630	56,360,300	2,746,558	74,275,500	2,921,188

CATCH: BY WATERS

Species	Off California [1]		Off Latin America	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Anchovies	257,500	$3,722		
Barracuda	1,801,200	66,912	381,600	$27,947
Cabrilla			331,700	13,528
Carp	158,000	2,140		
Catfish	184,900	22,647		
Cod [1]	6,036,400	76,100		
Corbina			1,000	62
Flounders:				
"California halibut"	648,500	52,859	388,500	28,250
"Sole"	8,967,600	450,840		
Other	1,376,700	56,691		
Flyingfish	26,400	885		
Grayfish	520,600	12,355	5,700	80
Groupers			61,400	3,076
Hake	56,900	572		
Halibut	1,023,000	64,192		
Hardhead	147,400	6,882		
Herring	798,900	4,518	2,700	21
Horse mackerel	1,581,300	15,013		
Kingfish	634,300	14,772		

[1] The catch of cod was taken off Alaska.

Fisheries of California, 1934—Continued

CATCH: BY WATERS—Continued

Species	Off California		Off Latin America	
	Pounds	*Value*	*Pounds*	*Value*
FISH—continued				
"Lingcod"	856, 500	$27, 796	100	$3
Mackerel	113, 582, 300	718, 592	266, 200	1, 536
Marlin	61, 300	2, 653	3, 500	146
Mullet	18, 000	766	1, 000	29
Perch	192, 400	11, 906	300	6
Pilchard or sardine	1, 135, 956, 300	4, 178, 049	2, 500	39
Pompano	4, 500	1, 906		
Rock bass	331, 500	17, 332	80, 900	3, 365
Rockfishes	4, 411, 800	154, 349	196, 800	8, 603
Rudderfishes	32, 300	1, 389		
Sablefish	2, 104, 100	56, 833	1, 100	23
Salmon	4, 319, 600	329, 571		
Sculpin	71, 200	4, 432		
Sea bass:				
Black	53, 700	1, 725	805, 100	36, 058
White	468, 700	29, 183	382, 900	27, 276
Shad	872, 600	28, 288		
Sheepshead	141, 800	4, 753	1, 700	48
Skates	232, 300	2, 969		
Smelt	728, 600	30, 339	1, 400	75
Spanish mackerel			6, 900	225
Splittail	55, 000	662		
Squawfish	1, 600	53		
Striped bass	801, 300	47, 794		
Suckers	63, 000	701		
Swordfish	257, 900	36, 312	6, 100	832
Tomcod	900	18		
Tuna and tunalike fishes:				
Albacore	119, 800	9, 203		
Bluefin	18, 291, 700	842, 502	66, 100	3, 580
Bonito	3, 003, 000	72, 232	199, 700	4, 644
Skipjack or striped tuna			14, 830, 200	593, 524
Yellowfin	19, 500	984	60, 893, 700	3, 052, 245
Whitebait	106, 000	5, 187		
Whitefish	47, 700	2, 931	45, 500	2, 274
Yellowtail	210, 600	7, 774	2, 136, 600	71, 614
Other fish	233, 000	6, 220	1, 100	53
Total	1, 311, 870, 100	7, 486, 144	81, 102, 000	3, 879, 162
SHELLFISH				
Crabs	3, 792, 700	313, 237		
Sea crawfish or spiny lobster	366, 600	58, 349	816, 100	121, 915
Shrimp	1, 784, 600	27, 406		
Abalone	644, 700	104, 742		
Clams:				
Hard	28, 600	5, 452		
Pismo	35, 200	7, 373		
Soft	71, 100	15, 639		
Octopus	30, 400	1, 964		
Oysters, market:				
Eastern	89, 100	38, 981		
Japanese	6, 700	1, 675		
Native	5, 000	2, 728		
Squid	1, 530, 500	31, 722		
Turtles			3, 700	185
Total	8, 385, 200	609, 268	819, 800	122, 100
WHALE PRODUCTS				
Whale meat	2, 044, 000	40, 880		
Whale oil	1, 954, 400	50, 700		
Total	3, 998, 400	91, 580		
Grand total	1, 324, 253, 700	8, 186, 992	81, 921, 800	4, 001, 262

Fisheries of the northern district of California, 1934

OPERATING UNITS: BY GEAR

Item	Gill nets	Lines		Dip nets	Traps, crab	Shovels	Total, exclusive of duplication
		Set and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1	26	32		1		34
On boats and shore	23	95	218	30	34	14	271
Total	24	121	250	30	35	14	305
Vessels, motor	1	9	14		1		14
Net tonnage	7	73	121		7		121
Boats:							
Motor	14	70	194		32		202
Other	1	1					1
Apparatus:							
Number	16	497	1,006	30	579	14	
Square yards	12,000						
Hooks		88,086	4,604				

CATCH: BY GEAR

Species	Gill nets		Lines				Dip nets	
			Set and hand		Troll			
FISH								
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Other	7,000	$294	1,300	$53				
Halibut			793,400	49,863	14,800	$857		
Herring	3,500	26						
"Lingcod"			138,900	3,892	24,500	423		
Perch	5,200	142					400	$10
Rockfishes			125,900	3,222	2,200	291		
Sablefish			696,300	20,776				
Salmon					2,769,300	211,539		
Smelt	15,800	602					13,100	363
Whitebait	400	17					75,600	3,407
Other fish			4,500	334	400	7		
Total	31,900	1,081	1,760,300	78,140	2,811,200	213,117	89,100	3,780
SHELLFISH								
Octopus			700	35				
Grand total	31,900	1,081	1,761,000	78,175	2,811,200	213,117	89,100	3,780

Species	Paranzella nets		Traps		Shovels	
FISH						
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"Sole"	3,219,900	$160,995				
Other	480,300	16,634				
Grayfish	4,100	41				
Hake	800	8				
Halibut	214,800	13,472				
"Lingcod"	267,400	6,775				
Rockfishes	272,200	6,639				
Sablefish	98,300	2,888				
Skates	5,500	68				
Tomcod	300	6				
Other fish	106,100	2,122				
Total	4,669,700	209,648				
SHELLFISH						
Crabs	100	9	110,700	$7,044		
Clams:						
Hard					9,900	$903
Soft					100	11
Total	100	9	110,700	7,044	10,000	914
Grand total	4,669,800	209,657	110,700	7,044	10,000	914

NOTE.—The catch by paranzella nets was made entirely by fishermen from the San Francisco district.

Fisheries of the San Francisco district of California, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines, sardine	Lampara and ring nets, sardine	Haul seines	Gill nets			Lines		Fyke nets
				Drift, salmon	Drift, shad	Other	Set and hand	Troll	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	346	104					6	79	
On boats and shore		84	13	279	339	66	165	212	80
Total	346	188	13	279	339	66	171	291	80
Vessels:									
Motor	33	10					1	15	
Net tonnage	1,446	130					9	244	
Sail							2		
Net tonnage							824		
Total vessels	33	10					3	15	
Total net tonnage	1,446	130					833	244	
Boats:									
Motor		10	5	154	186	36	33	208	52
Other			1	1	5	2	20		7
Accessory boats	33	10	5				30		
Apparatus:									
Number	33	20	6	155	191	55	1,150	870	2,075
Length, yards	11,187	5,550	770						
Square yards				534,750	673,275	64,543			
Hooks							63,032	5,315	

Item	Dip nets	Bag nets, shrimp	Paranzella nets	Beam trawls	Traps, crab	Harpoons, whaling	Rakes and tongs	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		17	88			16			603
On boats and shore	3	29		19	275		20	82	937
Total	3	46	88	19	275	16	20	82	1,540
Vessels:									
Steam						2			2
Net tonnage						41			41
Motor		4	18						61
Net tonnage		25	255						1,761
Sail									2
Net tonnage									824
Total vessels		4	18			2			65
Total net tonnage		25	255			41			2,626
Boats:									
Motor	2	4		19	268		9		555
Other	1	3					9	6	38
Accessory boats									78
Apparatus:									
Number	3	11	9	19	5,226	2	20	82	
Length, yards		7,312							
Yards at mouth			150	127					

Fisheries of the San Francisco district of California, 1934—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Haul seines		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			21, 200	$317	45, 800	$687		
Carp					117, 600	1, 764	28, 700	$262
Flounders, other							600	25
Hardhead					134, 900	6, 141		
Herring					395, 500	2, 139	360, 200	1, 948
Kingfish			900	27				
"Lingcod"					300	10		
Mackerel			3, 700	111				
Perch			500	35	21, 000	1, 470	92, 000	6, 440
Pilchard or sardine	328, 164, 200	$1, 213, 497	39, 635, 000	145, 625	1, 400	14	200	2
Salmon							397, 600	24, 379
Sea bass, white			200	19			100	9
Shad							872, 600	28, 288
Smelt			16, 300	798	3, 000	147	239, 700	11, 733
Splittail					51, 000	510		
Squawfish							1, 100	36
Striped bass							799, 700	47, 695
Suckers							2, 000	91
Tomcod								
Whitebait			100	2			400	20
Other fish			2, 400	120	3, 500	175	400	8
Total	328, 164, 200	1, 213, 497	39, 680, 300	147, 054	774, 000	13, 057	2, 795, 300	120, 936

Species	Lines				Fyke nets		Dip nets	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					11, 700	$114		
Catfish	26, 900	$2, 664			158, 000	19, 983		
Cod	6, 036, 400	76, 100						
Flounders:								
"California halibut"	1, 100	88	900	$72				
"Sole"	4, 200	210						
Other	1, 400	62						
Grayfish	21, 300	213						
Hardhead					12, 500	741		
Kingfish	100	3						
"Lingcod"	236, 600	8, 816	1, 200	24				
Rockfishes	311, 100	14, 088						
Sablefish	87, 500	2, 188						
Salmon			866, 500	64, 824				
Sculpin	100	1						
Skates	200	2						
Smelt							7, 600	$372
Splittail					4, 000	152		
Squawfish					500	17		
Striped bass	1, 600	99						
Suckers					61, 000	610		
Whitebait							4, 400	219
Other fish	3, 400	86						
Total	6, 731, 900	104, 620	868, 600	64, 920	247, 700	21, 617	12, 000	591
SHELLFISH								
Octopus	10, 200	454						
Grand total	6, 742, 100	105, 074	868, 600	64, 920	247, 700	21, 617	12, 000	591

Fisheries of the San Francisco district of California, 1934—Continued

CATCH: BY GEAR—Continued

Species	Bag nets		Paranzella nets		Beam trawls	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:						
"California halibut"			26,100	$2,192		
"Sole"			4,288,900	243,239		
Other			714,800	31,650		
Grayfish			75,300	753		
Hake			48,200	482		
Kingfish			13,000	391		
"Lingcod"			85,800	3,198		
Rockfishes			233,100	10,556		
Sablefish			70,900	1,773		
Sculpin			700	7		
Skates			168,100	2,101		
Tomcod			500	10		
Other fish			86,400	2,160		
Total			5,811,800	298,512		
SHELLFISH						
Crabs			31,500	2,703		
Shrimp	1,333,800	$20,007			449,900	$7,215
Octopus			400	17		
Total	1,333,800	20,007	31,900	2,720	449,900	7,215
Grand total	1,333,800	20,007	5,843,700	301,232	449,900	7,215

Species	Traps		Harpoons		Rakes and tongs		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	3,390,300	$290,890						
Clams:								
Hard							14,600	$3,595
Soft							71,000	15,628
Oysters, market:								
Eastern					89,100	$38,981		
Native					5,000	2,728		
Total	3,390,300	290,890			94,100	41,709	85,600	19,223
WHALE PRODUCTS								
Whale meat			2,044,000	$40,880				
Whale oil			1,954,400	50,700				
Total			3,998,400	91,580				
Grand total	3,390,300	290,890	3,998,400	91,580	94,100	41,709	85,600	19,223

Fisheries of the Monterey district of California, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines, sardine	Lampara and ring nets		Gill nets			Lines	
		Sardine	Other	Set, "California halibut"	Set, crab	Other	Set and hand	Troll
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	433	188	40					
On boats and shore		174	110	13	36	41	199	182
Total	433	362	150	13	36	41	199	182
Vessels, motor	42	17	5					
Net tonnage	1,669	204	52					
Boats:								
Motor		15	18	8	25	21	149	173
Other						10	33	
Accessory boats	42	32	23					
Apparatus:								
Number	42	32	23	8	25	34	853	467
Length, yards	13,850	8,840	4,025					
Square yards				37,826	49,225	36,840		
Hooks							87,646	2,672

Fisheries of the Monterey district of California, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Paranzella nets	Traps		Rakes and tongs	Shovels	Abalone outfits	Total, exclusive of duplication
		Crab	Octopus				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	8	----	----	----	----	68	648
On boats and shore	4	14	2	6	31	16	556
Total	12	14	2	6	31	84	1,204
Vessels, motor	2	----	----	----	----	14	67
Net tonnage	28	----	----	----	----	103	1,878
Boats:							
Motor	2	8	1	1	7	3	217
Other	----	4	----	3	12	----	38
Accessory boats	----	----	----	----	----	----	89
Apparatus:							
Number	2	112	6	6	31	17	----
Yards at mouth	33	----	----	----	----	----	----

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Anchovies	----	----	126,800	$1,921	600	$9
Flounders:						
"California halibut"	----	----	1,200	93	28,100	2,086
"Sole"	----	----	100	3	4,000	145
Other	----	----	----	----	9,100	260
Herring	4,000	$40	2,300	23	4,900	49
Horse mackerel	27,400	596	107,900	2,346	2,500	55
Kingfish	----	----	81,700	2,575	78,600	2,477
"Lingcod"	----	----	100	4	2,300	106
Mackerel	99,300	799	4,607,700	37,142	500	5
Perch	----	----	3,200	138	23,700	896
Pilchard or sardine	342,803,300	1,270,428	136,117,000	504,509	3,100	31
Pompano	----	----	100	53	----	----
Rockfishes	----	----	100	2	700	26
Sculpin	----	----	----	----	700	8
Sea bass, white	----	----	1,300	135	1,100	125
Skates	----	----	----	----	4,200	51
Smelt	1,200	51	32,900	1,399	114,800	4,859
Tuna, albacore	800	60	----	----	----	----
Whitebait	----	----	17,000	1,081	2,300	148
Other fish	----	----	----	----	300	21
Total	342,936,000	1,271,974	141,099,400	551,424	281,500	11,357
SHELLFISH						
Crabs	----	----	----	----	201,400	10,091
Squid	1,100	23	1,484,400	30,631	900	19
Total	1,100	23	1,484,400	30,631	202,300	10,110
Grand total	342,937,100	1,271,997	142,583,800	582,055	483,800	21,467

Fisheries of the Monterey district of California, 1934—Continued

CATCH: BY GEAR—Continued

Species	Lines				Paranzella nets	
	Set and hand		Troll			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Flounders:						
"California halibut"	3,400	$252	400	$27	2,800	$207
"Sole"	16,300	591			914,400	30,399
Other	13,300	534			133,900	5,051
Grayfish	400	4			5,700	57
Hake					7,700	77
Horse mackerel	700	14				
Kingfish	73,500	2,318			10,400	329
"Lingcod"	84,300	3,880	1,500	70	12,100	555
Mackerel	416,400	3,352				
Perch	1,700	65			900	37
Rockfishes	1,676,500	51,895	200	8	97,700	3,990
Sablefish	441,700	8,177			64,400	1,192
Salmon			286,200	28,829		
Sculpin	3,700	37				
Skates	6,300	77			29,100	357
Smelt	13,800	584				
Other fish	800	41			21,900	1,159
Total	2,752,800	71,821	288,300	28,934	1,301,000	43,410
SHELLFISH						
Crabs					500	24
Octopus	4,200	316				
Total	4,200	316			500	24
Grand total	2,757,000	72,137	288,300	28,934	1,301,500	43,434

Species	Traps		Rakes and tongs		Shovels		Abalone outfits	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	33,600	$1,683						
Shrimp	900	184						
Abalone							557,400	$95,914
Clams, Pismo					4,800	$1,088		
Octopus	14,800	1,127						
Oysters, market, Japanese			6,700	$1,675				
Total	49,300	2,994	6,700	1,675	4,800	1,088	557,400	95,914

Fisheries of the San Pedro district of California, 1934

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara and ring nets			Gill nets		
	Mackerel	Sardine	Tuna	Mackerel	Sardine	Other[1]	Drift, barracuda	Set, sea bass	Other
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	168	743	696	522	430	34	12	8	2
On boats and shore				74	17	22	38	58	35
Total	168	743	696	596	447	56	50	66	37
Vessels, motor	17	71	66	53	41	3	4	3	1
Net tonnage	466	2,920	2,884	869	914	61	41	22	8
Boats:									
Motor				9	2	6	14	26	15
Other								3	5
Accessory boats	17	71	66	62	43	9			
Apparatus:									
Number	17	71	66	62	43	9	18	32	23
Length, yards	6,707	27,187	38,212	24,686	18,282	3,240			
Square yards							201,546	155,936	14,522

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[1] Includes 1 haul seine.

Fisheries of the San Pedro district of California, 1934—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Trammel nets	Lines: Set and hand	Lines: Troll	Paranzella nets	Traps, lobster	Harpoons, swordfish	Shovels	Abalone outfits	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	15	373	18	10	16	27		5	1, 725
On boats and shore	72	410	206	14	178	62	64	1	723
Total	87	783	224	24	194	89	64	6	2, 448
Vessels, motor	5	51	7	3	8	9		1	186
Net tonnage	47	2, 902	47	41	62	96		9	7, 155
Boats:									
Motor	30	251	143	5	112	28	1		349
Other	1	33			23		3	1	50
Accessory boats		32							205
Apparatus:									
Number	36	1, 592	724	4	5, 172	37	64	2	
Square yards	188, 784								
Yards at mouth				67					
Hooks		289, 456	724						

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			63, 100	$788				
Barracuda	371, 500	$13, 018	1, 001, 600	36, 341	106, 100	$4, 404		
Flounders:								
"California halibut"	100	10	400	49	100	10	324, 100	$29, 072
"Sole"			200	10			5. 900	248
Other			100	4			100	4
Flyingfish			1, 300	43	25, 100	842		
Grayfish	100	4	3, 000	88	42, 000	1, 109	31, 500	913
Herring					400	20		
Horse mackerel	391, 500	3, 256	1, 042, 900	8, 673	600	5		
Kingfish			240, 800	4, 239	100	2		
"Lingcod"							100	4
Mackerel	10, 461, 100	66, 355	75, 116, 900	476, 480	28, 800	273	100	1
Marlin	300	13						
Mullet			2, 200	102	1, 500	73		
Perch			29, 700	1, 987	7, 300	303		
Pilchard or sardine	177, 098, 500	639, 808	108, 082, 000	390, 468	300	6		
Pompano			4, 400	1, 853				
Rock bass	7, 500	437	9, 900	574	2, 900	159	3, 200	162
Rockfishes					400	16	300	10
Rudderfishes	100	6	30, 600	1, 315	1, 400	57		
Sablefish							300	8
Sculpin			100	8			100	10
Sea bass:								
Black	800	33	600	24	900	43	900	42
White	62, 300	3, 656	204, 400	11, 899	127, 100	8, 756	300	17
Sheepshead					1, 500	52	4, 100	133
Skates							10, 500	193
Smelt	2, 700	92	186, 200	6, 314	49, 900	1, 932		
Tuna and tunalike fishes:								
Albacore	1, 300	98						
Bluefin	16, 343, 100	752, 727	1, 594, 900	73, 456	100	5		
Bonito	1, 152, 400	28, 662	815, 400	20, 279	8, 600	215	1, 600	40
Whitefish			200	13	400	26		
Yellowtail	70, 700	3, 120	45, 100	1, 993	500	21		
Other fish	100	2	300	21	200	10	200	8
Total	205, 964, 100	1, 511, 297	188, 476, 300	1, 037, 021	406, 200	18, 339	383, 300	30, 865
SHELLFISH								
Sea crawfish or spiny lobster							7, 900	1, 283
Squid			39, 400	913	100	3	200	5
Total			39, 400	913	100	3	8, 100	1, 288
Grand total	205, 964, 100	1, 511, 297	188, 515, 700	1, 037, 934	406, 300	18, 342	391, 400	32, 153

Fisheries of the San Pedro district of California, 1934—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Lines				Paranzella nets	
	Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	62,400	$2,282	34,200	$1,230		
Flounders:						
"California halibut"	25,400	2,318			181,400	$12,923
"Sole"	6,600	306			504,700	14,488
Other	14,800	2,120				
Grayfish	305,100	8,910	500	13	2,600	43
Hake	200	5				
Horse mackerel	6,200	52				
Kingfish	130,400	2,297				
"Lingcod"	1,400	39				
Mackerel	11,545,000	73,434				
Marlin	6,200	307				
Perch	5,900	335				
Rock bass	137,300	7,876			100	5
Rockfishes	1,404,800	52,674			800	25
Rudderfishes	200	11				
Sablefish	643,200	19,805			200	4
Sculpin	57,100	3,938				
Sea bass:						
Black	14,400	652				
White	6,600	473				
Sheepshead	69,100	2,378				
Skates	3,000	56			1,000	19
Smelt	3,300	113				
Tuna and tunalike fishes:						
Albacore	5,300	412	112,400	8,633		
Bluefin	1,500	69	600	31		
Bonito	13,100	326	9,900	246		
Yellowfin	100	8	100	6		
Whitefish	30,100	2,087				
Yellowtail	6,100	270	4,100	178		
Other fish	8,000	241				
Total	14,512,800	183,794	161,800	10,337	690,800	27,507
SHELLFISH						
Octopus	100	15				
Grand total	14,512,900	183,809	161,800	10,337	690,800	27,507

Species	Traps		Harpoons		Shovels		Abalone outfits	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Kingfish	200	$4						
Marlin			13,400	$664				
Perch	400	31						
Rock bass	55,200	3,175						
Rockfishes	200	6						
Sculpin	1,300	64						
Sheepshead	62,800	2,038						
Swordfish			193,100	28,050				
Whitefish	1,100	71						
Total	121,200	5,389	206,500	28,714				
SHELLFISH								
Crabs	24,600	793						
Sea crawfish or spiny lobster	288,000	45,955						
Abalone							87,300	$8,828
Clams:								
Hard					4,100	$954		
Pismo					30,400	6,285		
Total	312,600	46,748			34,500	7,239	87,300	8,828
Grand total	433,800	52,137	206,500	28,714	34,500	7,239	87,300	8,828

Fisheries of the San Pedro district of California, 1934—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Gill nets		Trammel nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Barracuda			9,400	$797		
Flounders, "California halibut"					102,200	$7,750
Marlin	100	$4				
Mullet			1,000	29		
Sea bass:						
Black			400	19	900	39
White			9,400	695	100	6
Tuna and tunalike fishes:						
Skipjack or striped tuna	466,700	18,684				
Yellowfin	1,883,200	94,362				
Yellowtail	9,000	359	200	8		
Total	2,359,000	113,409	20,400	1,548	103,200	7,795

Species	Lines				Harpoons		Traps	
	Set and hand		Troll					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Barracuda	129,900	$11,034	3,700	$311				
Cabrilla	168,200	7,077						
Corbina	1,000	62						
Grayfish	1,100	32						
Grouper	39,900	2,075						
"Lingcod"	100	3						
Rock bass	25,100	1,421						
Rockfishes	14,100	535						
Sea bass:								
Black	473,900	22,106						
White	113,300	8,399						
Sheepshead	200	7						
Smelt	100	4						
Spanish mackerel	3,200	152						
Tuna and tunalike fishes:								
Bluefin	16,500	1,262						
Bonito	34,300	931						
Skipjack or striped tuna	3,342,200	133,797						
Yellowfin	17,568,600	880,326						
Whitefish	18,100	910						
Yellowtail	1,012,600	40,419	300	12				
Other fish	1,100	53						
Total	22,963,500	1,110,605	4,000	323				
SHELLFISH								
Sea crawfish or spiny lobster							111,100	$21,001
Turtles					300	$23		
Total					300	23	111,100	21,001
Grand total	22,963,500	1,110,605	4,000	323	300	23	111,100	21,001

Fisheries of the San Diego district of California, 1934

OPERATING UNITS: BY GEAR

Item	Lampara and rin gnets		Gill nets			Trammel nets	Lines		Traps, lobster	Harpoons, swordfish	Total, exclusive of duplication
	Mackerel	Sardine	Drift, barracuda	Set, sea bass	Other		Set and hand	Troll			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	130	69	4	4		4	566		2	19	676
On boats and shore	18	9	36	31	13	31	129	56	53	32	214
Total	148	78	40	35	13	35	695	56	55	51	890
Vessels, motor	14	7	1	1		1	64		1	5	76
Net tonnage	111	65	5	5		5	4,206		6	51	4,296
Boats:											
Motor	2	1	15	13	8	11	66	42	35	9	109
Other					1		2		4		5
Accessory boats	16	8					61				72
Apparatus:											
Number	16	8	16	14	9	12	907	234	1,348	14	
Length, yards	4,813	2,320									
Square yards			126,800	69,230	14,360	121,120					
Hooks							45,620	234			

Fisheries of the San Diego district of California, 1934—Continued

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	500	$19	72, 600	$3, 105	104, 700	$4, 476		
Flounders: "California halibut"			200	10			51, 000	$3, 331
Grayfish			7, 300	52	7, 100	51	8, 200	58
Herring					28, 100	273		
Horse mackerel			1, 600	16				
Kingfish			100	3	700	15		
Mackerel			9, 831, 700	52, 747	2, 400	13		
Mullet					14, 300	591		
Perch			300	10	200	7		
Pilchard, or sardine			4, 051, 300	13, 301				
Rock bass			8, 000	333	700	30	100	5
Rockfishes			700	21	200	10	200	9
Sea bass:								
Black			3, 700	95	1, 000	26		
White			24, 200	1, 517	29, 600	1, 856	200	14
Skates			300	3	100	2	4, 000	40
Smelt			1, 200	47	27, 100	933		
Tuna and tunalike fishes:								
Bluefin	139, 400	6, 432	160, 000	7, 378				
Bonito	3, 300	75	387, 200	8, 681	47, 000	1, 053	100	3
Yellowtail			30, 400	791	400	11		
Total	143, 200	6, 526	14, 580, 800	88, 110	263, 600	9, 347	63, 800	3, 460
SHELLFISH								
Sea crawfish or spiny lobster							100	11
Squid			4, 400	128				
Total			4, 400	128			100	11
Grand total	143, 200	6, 526	14, 585, 200	88, 238	263, 600	9, 347	63, 900	3, 471

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	44, 000	$1, 884	3, 600	$153				
Flounders:								
"California halibut"	1, 800	119						
"Sole"	2, 400	206						
Grayfish	6, 400	46						
Kingfish	3, 100	75			700	$17		
Mackerel	1, 464, 900	7, 859	3, 800	21				
Marlin	1, 100	46					40, 300	$1, 623
Rock bass	45, 600	1, 972			61, 000	2, 604		
Rockfishes	283, 700	10, 832			800	29		
Sablefish	1, 300	22						
Sculpin	7, 400	359						
Sea bass:								
Black	31, 400	810						
White	11, 300	707						
Sheepshead	400	14			3, 900	138		
Swordfish							64, 800	8, 262
Tuna and tunalike fishes:								
Bluefin	51, 200	2, 363	900	41				
Bonito	372, 600	8, 353	191, 800	4, 299				
Yellowfin	19, 300	970						
Whitefish	15, 900	734						
Yellowtail	47, 700	1, 243	5, 600	147				
Total	2, 411, 500	38, 614	205, 700	4, 661	66, 400	2, 788	105, 100	9, 885
SHELLFISH								
Sea crawfish or spiny lobster					70, 600	11, 100		
Grand total	2, 411, 500	38, 614	205, 700	4, 661	137, 000	13, 888	105, 100	9, 885

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro district.

Fisheries of the San Diego district of California, 1934—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Barracuda	--------	--------	--------	--------	38, 600	$2, 554	--------	--------
Flounders, "California halibut"	--------	--------	--------	--------	--------	--------	285, 500	$20, 443
Grayfish	--------	--------	--------	--------	3, 400	36	400	4
Herring	--------	--------	--------	--------	2, 700	21	--------	--------
Perch	--------	--------	300	$6	--------	--------	--------	--------
Pilchard	--------	--------	2, 500	39	--------	--------	--------	--------
Rock bass	--------	--------	--------	--------	400	14	200	7
Rockfishes	--------	--------	--------	--------	--------	--------	300	16
Sea bass:								
Black	--------	--------	--------	--------	5, 600	233	1, 600	69
White	--------	--------	--------	--------	222, 200	15, 533	--------	--------
Sheepshead	--------	--------	--------	--------	--------	--------	300	8
Smelt	--------	--------	600	32	600	33	--------	--------
Tuna and tunalike fishes, yellowfin	791, 400	$39, 571	--------	--------	--------	--------	--------	--------
Yellowtail	--------	--------	--------	--------	1, 600	43	--------	--------
Total	791, 400	39, 571	3, 400	77	275, 100	18, 467	288, 300	20, 547
SHELLFISH								
Sea crawfish or spiny lobster	--------	--------	--------	--------	--------	--------	1, 200	164
Grand total	791, 400	39, 571	3, 400	77	275, 100	18, 467	289, 500	20, 711

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Barracuda	154, 500	$10, 239	45, 500	$3, 012	--------	--------	--------	------
Cabrilla	163, 500	6, 451	--------	--------	--------	--------	--------	------
Flounders, "California halibut"	800	57	--------	--------	--------	--------	--------	------
Grayfish	800	8	--------	--------	--------	--------	--------	------
Groupers	21, 500	1, 001	--------	--------	--------	--------	--------	------
Mackerel	266, 200	1, 536	--------	--------	--------	--------	--------	------
Marlin	--------	--------	--------	--------	--------	--------	3, 400	$142
Rock bass	53, 000	1, 846	--------	--------	2, 200	$77	--------	------
Rockfishes	182, 400	8, 052	--------	--------	--------	--------	--------	------
Sablefish	1, 100	23	--------	--------	--------	--------	--------	------
Sea bass:								
Black	322, 700	13, 592	--------	--------	--------	--------	--------	------
White	37, 900	2, 643	--------	--------	--------	--------	--------	------
Sheepshead	1, 200	33	--------	--------	--------	--------	--------	------
Smelt	100	6	--------	--------	--------	--------	--------	------
Spanish mackerel	3, 700	73	--------	--------	--------	--------	--------	------
Swordfish	--------	--------	--------	--------	--------	--------	6, 100	832
Tuna and tunalike fishes:								
Bluefin	49, 600	2, 318	--------	--------	--------	--------	--------	------
Bonito	161, 400	3, 624	4, 000	89	--------	--------	--------	------
Skipjack, or striped tuna	11, 021, 300	441, 043	--------	--------	--------	--------	--------	------
Yellowfin	40, 650, 500	2, 037, 986	--------	--------	--------	--------	--------	------
Whitefish	27, 400	1, 364	--------	--------	--------	--------	--------	------
Yellowtail	1, 111, 900	30, 746	1, 000	27	--------	--------	--------	------
Total	54, 231, 500	2, 562, 641	50, 500	3, 128	2, 200	77	9, 500	974
SHELLFISH								
Sea crawfish or spiny lobster	--------	--------	--------	--------	703, 800	100, 750	--------	------
Turtles	--------	--------	--------	--------	--------	--------	3, 400	162
Total	--------	--------	--------	--------	703, 800	100, 750	3, 400	162
Grand total	54, 231, 500	2, 562, 641	50, 500	3, 128	706, 000	100, 827	12, 900	1, 136

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro district.

HALIBUT FISHERY OF THE PACIFIC COAST

The halibut fishery of the Pacific coast, which is prosecuted by United States (including Alaska) and Canadian vessels, ranks as one of the foremost fisheries of that section. During 1934, the total catch of halibut by vessels of both nationalities amounted to 46,018,000 pounds, valued at $2,963,000. This is an increase of less than one-half of 1 percent in volume and 15 percent in value as compared with the catch and its value in 1933. Of the total catch in 1934, 79 percent was taken by United States craft and 21 percent by Canadian craft. Considered according to ports of landing, 44 percent was landed at ports in the State of Washington; 40 percent at Canadian ports; and 16 percent at ports in Alaska.

NOTE.—These statistics are compiled from data collected by the International Fisheries Commission for Washington and British Columbia, and by Bureau agents for Alaska. The weights of the above species represent the fish after evisceration and removal of heads.

Halibut fishery of the Pacific coast, 1934

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

Item	Washington fleet	Alaska fleet	Total
Regular halibut vessels:			
Number	134	92	226
Net tonnage	3,945	1,636	5,581
Crew	963	461	1,424
Dories [1]	13	--------	13
Skates of lines	3,824	2,082	5,906
Vessels in other fisheries, but landing 1 or more fares of halibut:			
Number	15	13	28
Net tonnage	266	98	364
Crew	73	40	113
Skates of lines	284	189	473
Regular halibut boats:			
Number	--------	32	32
Crew	--------	65	65
Skates of lines	--------	416	416
Boats in other fisheries, but landing 1 or more fares of halibut:			
Number	2	78	80
Crew	6	128	134
Skates of lines	24	410	434

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
WASHINGTON FLEET								
Regular vessels:								
Halibut	18,840,728	$1,398,203	2,634,440	$165,286	1,215,610	$69,843	22,690,778	$1,633,332
Sablefish	2,187,108	83,215	2,018	65	9,118	375	2,198,244	83,655
"Lingcod"	682,021	23,482	--------	--------	--------	--------	682,021	23,482
Rockfishes	376,253	14,602	--------	--------	--------	--------	376,253	14,602
Total	22,086,110	1,519,502	2,636,458	165,351	1,224,728	70,218	25,947,296	1,755,071
Other vessels and boats:								
Halibut	387,603	28,881	--------	--------	--------	--------	387,603	28,881
Sablefish	22,553	838	--------	--------	--------	--------	22,553	838
"Lingcod"	48,387	1,107	--------	--------	--------	--------	48,387	1,107
Rockfishes	10,265	257	--------	--------	--------	--------	10,265	257
Total	468,808	31,083	--------	--------	--------	--------	468,808	31,083

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[1] The dories shown are those which actually engage in fishing. In previous figures lifeboats were also included.

Halibut fishery of the Pacific coast, 1934—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS—Continued

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
ALASKA FLEET								
Regular vessels:								
Halibut	1, 329, 811	$95, 153	5, 851, 433	$374, 892	4, 188, 010	$230, 604	11, 369, 254	$700, 649
Sablefish	49, 758	1, 948	27, 445	460	149, 442	3, 786	226, 645	6, 194
"Lingcod"	6, 612	311	--------	--------	39, 000	1, 170	45, 612	1, 481
Rockfishes	2, 501	130	--------	--------	566	12	3, 067	142
Total	1, 388, 682	97, 542	5, 878, 878	375, 352	4, 377, 018	235, 572	11, 644, 578	708, 466
Other vessels and boats:								
Halibut	--------	--------	104, 035	6, 246	1, 748, 049	97, 890	1, 852, 084	104, 136
Sablefish	--------	--------	--------	--------	4, 460	136	4, 460	136
Total	--------	--------	104, 035	6, 246	1, 752, 509	98, 026	1, 856, 544	104, 272
COMBINED FLEETS								
Regular vessels:								
Halibut	20, 170, 539	1, 493, 356	8, 485, 873	540, 178	5, 403, 620	300, 447	34, 060, 032	2, 333, 981
Sablefish	2, 236, 866	85, 163	29, 463	525	158, 560	4, 161	2, 424, 889	89, 849
"Lingcod"	688, 633	23, 793	--------	--------	39, 000	1, 170	727, 633	24, 963
Rockfishes	378, 754	14, 732	--------	--------	566	12	379, 320	14, 744
Total	23, 474, 792	1, 617, 044	8, 515, 336	540, 703	5, 601, 746	305, 790	37, 591, 874	2, 463, 537
Other vessels and boats:								
Halibut	387, 603	28, 881	104, 035	6, 246	1, 748, 049	97, 890	2, 239, 687	133, 017
Sablefish	22, 553	838	--------	--------	4, 460	136	27, 013	974
"Lingcod"	48, 387	1, 107	--------	--------	--------	--------	48, 387	1, 107
Rockfishes	10, 265	257	--------	--------	--------	--------	10, 265	257
Total	468, 808	31, 083	104, 035	6, 246	1, 752, 509	98, 026	2, 325, 352	135, 355
All vessels and boats:								
Halibut	20, 558, 142	1, 522, 237	8, 589, 908	546, 424	7, 151, 669	398, 337	36, 299, 719	2, 466, 998
Sablefish	2, 259, 419	86, 001	29, 463	525	163, 020	4, 297	2, 451, 902	90, 823
"Lingcod"	737, 020	24, 900	--------	--------	39, 000	1, 170	776, 020	26, 070
Rockfishes	389, 019	14, 989	--------	--------	566	12	389, 585	15, 001
Grand total	23, 943, 600	1, 648, 127	8, 619, 371	546, 949	7, 354, 255	403, 816	39, 917, 226	2, 598, 892

CATCH OF HALIBUT: BY UNITED STATES AND CANADIAN VESSELS AND BOATS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
WASHINGTON FLEET								
Regular halibut vessels	18, 841	1, 398	2, 634	165	1, 216	70	22, 691	1, 633
Other vessels and boats	388	29	--------	--------	--------	--------	388	29
Total	19, 229	1, 427	2, 634	165	1, 216	70	23, 079	1, 662
ALASKA FLEET								
Regular halibut vessels	1, 330	95	5, 851	375	4, 188	231	11, 369	701
Other vessels and boats	--------	--------	104	6	1, 748	98	1, 852	104
Total	1, 330	95	5, 955	381	5, 936	329	13, 221	805
COMBINED FLEETS								
Regular halibut vessels	20, 171	1, 493	8, 485	540	5, 404	301	34, 060	2, 334
Other vessels and boats	388	29	104	6	1, 748	98	2, 240	133
Total	20, 559	1, 522	8, 589	546	7, 152	399	36, 300	2, 467
British Columbia fleet	--------	--------	9, 718	496	--------	--------	9, 718	496
Grand total	20, 559	1, 522	18, 307	1, 042	7, 152	399	46, 018	2, 963

NOTE.—In addition to the above it is estimated that about 850,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $175,000, were landed at Pacific coast ports during 1934.

VESSEL FISHERIES AT SEATTLE, WASH.

A total of 44,363,035 pounds of fishery products, valued at $2,754,582, were handled by Seattle wholesale dealers during 1934, exclusive of quantities received by transporting vessels or by rail from Alaska or Canada. This represents an increase of 2 percent in volume and 13 percent in value as compared with the volume and value of the products handled during the preceding year. Of the total quantity handled, 23,943,600 pounds, valued at $1,648,127, were landed by fishing vessels—a decrease of 1 percent in volume but an increase of 10 percent in value as compared with the previous year. Receipts by wholesale dealers from sources other than Alaska or Canada or from vessels in the halibut fleet, amounted to 20,419,435 pounds, valued at $1,106,455, which is an increase of 6 percent in volume and 16 percent in value.

Fishery products landed by United States vessels at Seattle, Wash., 1934 [1]

BY FISHING GROUNDS

Fishing grounds	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2									
	Number	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
West of Cape Spencer	446	8, 868, 923	$686, 348	5, 504, 626	$364, 710	31, 350	$1, 037	3, 679	$117	17, 409	$472	14, 425, 987	$1, 052, 784
South of Cape Spencer	710	3, 025, 896	265, 495	3, 158, 697	205, 684	2, 228, 069	84, 964	733, 341	24, 783	371, 610	14, 417	9, 517, 613	595, 343
Total	1, 156	11, 894, 819	951, 843	8, 663, 323	570, 394	2, 259, 419	86, 001	737, 020	24, 900	389, 019	14, 989	23, 943, 600	1, 648, 127

BY MONTHS

Months	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2									
	Number	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
January	13	------	------	------	------	------	------	51, 340	$3, 215	29, 044	$1, 811	80, 384	$5, 026
February	32	------	------	------	------	2, 141	$170	166, 445	5, 367	104, 373	3, 452	272, 959	8, 989
March	137	2, 077, 200	$147, 462	956, 492	$54, 415	31, 608	995	49, 011	1, 662	19, 551	760	3, 133, 862	205, 294
April	134	1, 544, 667	128, 682	991, 925	63, 414	11, 945	367	80, 356	1, 985	19, 601	428	2, 648, 494	194, 876
May	157	1, 865, 382	148, 222	1, 279, 186	78, 060	13, 365	672	89, 452	1, 884	19, 716	467	3, 267, 101	229, 305
June	128	1, 571, 579	122, 771	1, 253, 827	78, 511	78, 579	3, 758	42, 497	878	6, 137	164	2, 952, 619	206, 082
July	109	1, 157, 563	89, 562	999, 470	60, 908	151, 954	5, 524	15, 031	294	6, 640	197	2, 330, 658	156, 485
August	124	1, 435, 452	103, 102	1, 359, 234	88, 466	129, 276	4, 736	14, 839	435	16, 376	492	2, 955, 177	197, 231
September	97	845, 686	82, 134	881, 048	72, 039	539, 094	22, 742	15, 502	506	32, 198	1, 272	2, 313, 528	178, 693
October	117	789, 135	83, 512	439, 669	38, 672	1, 054, 128	38, 246	37, 066	1, 561	23, 991	1, 070	2, 343, 989	163, 061
November	83	608, 155	46, 396	502, 472	35, 909	218, 484	7, 564	36, 207	1, 764	38, 426	2, 073	1, 403, 744	93, 706
December	25	------	------	------	------	28, 845	1, 227	139, 274	5, 349	72, 966	2, 803	241, 085	9, 379
Total	1, 156	11, 894, 819	951, 843	8, 663, 323	570, 394	2, 259, 419	86, 001	737, 020	24, 900	389, 019	14, 989	23, 943, 600	1, 648, 127

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[1] Halibut fleet.

Fishery products received by Seattle wholesale dealers, 1934; by months [1]

Species	January		February		March		April		May		June	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:												
"Sole"	68,146	$2,346	63,477	$2,513	77,702	$3,121	110,187	$3,857	88,002	$3,113	110,934	$3,305
Other	4,794	102	6,297	150	1,964	65	182	4	618	6	167	2
Halibut					2,900	290	938	84	18,853	1,295	40,003	2,395
Herring	12,680	242	127,815	750	71,800	359	29,500	147				
"Lingcod"	21,285	1,053	31,194	1,082	38,314	1,247	21,374	639	31,608	765	36,180	641
Perch	1,371	34	4,251	134	8,228	188	6,910	158	3,067	68	1,039	21
Rockfishes	28,349	1,193	13,527	339	15,146	327	10,136	293	14,027	327	8,936	180
Salmon:												
Blueback, red or sockeye											12,119	848
Chinook or king	3,742	524	29,283	4,231	23,019	3,430	72,521	7,978	767,767	68,315	1,757,107	158,078
Chum or keta									65	2	356	9
Silver or coho									46,991	2,926	502,934	32,681
Smelt	36,585	1,510	49,848	1,303	53,450	1,915	578	35	5,125	242	20,233	1,012
Crabs	47,334	3,214	78,129	5,285	68,019	4,848	57,426	3,664	58,447	2,876	17,260	1,183
Octopus	2,099	84	3,868	154	5,847	177	5,350	214	5,724	173	4,439	133
Total	226,385	10,302	407,689	15,941	366,389	15,967	315,102	17,073	1,040,294	80,108	2,502,707	200,488

Species	July		August		September		October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:														
"Sole"	77,086	$2,314	82,276	$2,642	85,073	$2,550	62,787	$2,060	43,959	$1,445	93,855	$2,999	954,484	$32,265
Other	30	1	344	3	592	8	408	5	589	12	8,924	179	24,909	537
Halibut	63,692	3,818	20,985	1,262	1,327	106							148,698	9,250
Herring													241,795	1,498
"Lingcod"	55,342	1,092	51,639	1,323	20,509	538	13,246	449	8,537	326	16,645	666	345,873	9,821
Perch	3,890	102	5,942	120	5,161	103	8,372	242	3,428	113	9,225	280	60,884	1,563
Rockfishes	15,531	324	4,967	145	12,511	330	12,534	293	11,471	331	26,170	690	173,305	4,772
Sablefish	3,370	177	5,280	211	3,895	136							12,545	524
Salmon:														
Blueback, red or sockeye	18,700	1,411	19,751	1,635	1,624	103	399	29					52,593	4,026
Chinook or king	1,795,126	141,967	2,034,779	154,021	489,482	30,624	195,572	14,601	20,393	1,716			7,188,791	585,485
Chum or keta	795	24	31,923	908	118,447	2,753	2,808,616	69,279	902,898	21,757	933	28	3,864,033	94,760
Humpback or pink	985	20	4,143	83									5,128	103
Silver or coho	1,021,544	52,957	1,515,935	75,189	1,493,893	67,673	1,526,261	64,278	126,965	6,117	5,156	361	6,239,679	302,182
Smelt	43,292	1,666	35,080	1,370	60,422	2,317	80,310	3,365	24,189	866	30,719	1,447	439,831	17,048
Crabs	25,410	2,204	12,560	1,162	2,980	186	70,392	4,628	72,426	6,144	91,588	5,062	[2] 601,971	40,456
Octopus	5,810	174	5,340	161	5,896	177	8,207	267	4,092	122	8,244	329	64,916	2,165
Total	3,130,603	208,251	3,830,944	240,235	2,301,812	107,604	4,787,104	159,496	1,218,947	38,949	291,459	12,041	20,419,435	1,106,455

[1] This tabulation does not include fish received from Alaska or Canada or vessels in the halibut fleet.

[2] 29,174 dozen.

LAKE FISHERIES [12]

In 1934 the yield of the fisheries of the Great Lakes including those of the international lakes of northern Minnesota, in the United States and Canada amounted to 124,148,400 pounds, representing an increase of 23 percent as compared with the catch in the preceding year.

Considering the fishery of United States craft only, the catch amounted to 96,411,200 pounds, valued at $5,123,735, which is an increase of 29 percent in volume and 26 percent in value as compared with the catch in the previous year. These fisheries gave employment to 7,579 fishermen or 9 percent more than in 1932 when the first preceding survey of employment was made.

During the survey for 1934 data, statistics of the catch in 1933 also were collected. These are presented following the data for 1934:

Lake fisheries of the United States and Canada, 1934

CATCH: BY LAKES

Species	Lake Ontario			Lake Erie		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	152,700	67,600	220,300	8,356,100	2,297,900	10,654,000
Bowfin	500	(1)	500	5,400	(1)	5,400
Burbot	7,500	(1)	7,500	252,800	(1)	252,800
Carp	17,000	81,600	98,600	1,480,500	610,300	2,090,800
Catfish and bullheads	72,300	168,500	240,800	567,600	71,900	639,500
Cisco	----------	----------	----------	111,000	236,300	347,300
Eels	64,900	51,700	116,600	400	2,300	2,700
Goldfish	----------	----------	----------	67,800	(1)	67,800
Lake herring	126,300	609,100	735,400	----------	----------	----------
Lake trout	13,600	256,200	269,800	1,200	2,600	3,800
Mooneye	----------	----------	----------	24,900	(1)	24,900
Pike or pickerel (jacks)	14,900	140,400	155,300	500	19,900	20,400
Rock bass	5,600	(1)	5,600	3,200	(1)	3,200
Sauger	----------	----------	----------	785,300	(1)	785,300
Sheepshead	----------	----------	----------	2,218,200	(1)	2,218,200
Sturgeon	16,400	3,500	19,900	18,500	25,500	44,000
Sucker "mullet"	47,300	(1)	47,300	1,016,700	(1)	1,016,700
Sunfish	17,900	(1)	17,900	----------	----------	----------
White bass	----------	----------	----------	687,700	(1)	687,700
Whitefish:						
Common	83,600	489,500	573,100	777,400	915,900	1,693,300
Menominee	200	(1)	200	----------	----------	----------
Yellow perch	51,400	118,200	169,600	14,219,400	5,671,000	19,890,400
Yellow pike	24,500	28,600	53,100	1,245,900	292,700	1,538,600
Mussel shells	----------	----------	----------	968,700	(1)	968,700
Miscellaneous	----------	244,700	244,700	----------	1,354,400	1,354,400
Total	716,600	2,259,600	2,976,200	32,809,200	11,500,700	44,309,900

[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

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[12] The statistics of the catch presented herewith were obtained principally from the records of the various State fishery agencies and from the Dominion Bureau of Statistics, Ottawa, Canada. The data for the operating units (fishermen, vessels, boats, and gear) of the United States were obtained largely by Bureau agents in a special canvass; although State records in several instances were very helpful in this work. In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for 2 seasons. For Lake of the Woods the seasons are from June 1 to Nov. 1 and Dec. 1 to Apr. 1 and for Rainy and Namakan Lakes from May 15 to Nov. 1 and Dec. 1 to Apr. 1. The catches for these 2 seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between Jan. 1 and Apr. 1 is estimated at less than 3 percent of the total catch.

Lake fisheries of the United States and Canada, 1934—Continued

CATCH: BY LAKES—Continued

Species	Lake Huron			Lake Michigan	Lake Superior		
	United States	Canada	Total	United States	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	--------	1, 400	1, 400	--------	--------	--------	--------
Bowfin	3, 100	(1)	3, 100	--------	--------	--------	--------
Buffalofish	--------	--------	--------	1, 000	--------	--------	--------
Burbot	2, 100	(1)	2, 100	40, 000	1, 800	(1)	1, 800
Carp	1, 015, 200	44, 200	1, 059, 400	1, 321, 100	1, 400	300	1, 700
Catfish and bullheads	50, 800	3, 600	54, 400	52, 200	300	(1)	300
Chubs	413, 700	448, 700	862, 400	6, 262, 200	472, 800	407, 000	879, 800
Lake herring	4, 371, 300	273, 900	4, 645, 200	6, 412, 400	13, 030, 700	1, 749, 900	14, 780, 600
Lake trout	1, 521, 500	3, 519, 900	5, 041, 400	5, 269, 100	3, 306, 300	1, 260, 700	4, 567, 000
Mooneye	300	(1)	300	--------	--------	--------	--------
Pike or pickerel (jacks)	7, 500	136, 700	144, 200	79, 900	5, 800	5, 600	11, 400
Rock bass	12, 800	(1)	12, 800	1, 400	200	(1)	200
Sauger	73, 200	(1)	73, 200	31, 300	2, 100	(1)	2, 100
Sheepshead	4, 300	(1)	4, 300	9, 300	--------	--------	--------
Smelt	--------	--------	--------	1, 029, 300	--------	--------	--------
Steelhead trout	--------	--------	--------	1, 600	--------	--------	--------
Sturgeon	--------	22, 700	22, 700	--------	--------	900	900
Sucker "mullet"	2, 198, 100	(1)	2, 198, 100	2, 062, 800	164, 700	(1)	164, 700
White bass	100	(1)	100	100	--------	--------	--------
Whitefish:							
Common	2, 565, 800	1, 944, 800	4, 510, 600	2, 181, 800	493, 200	295, 200	788, 400
Menominee	52, 600	(1)	52, 600	152, 900	23, 300	(1)	23, 300
Yellow perch	519, 400	157, 400	676, 800	1, 256, 200	4, 700	(1)	4, 700
Yellow pike	1, 615, 400	423, 400	2, 038, 800	162, 700	25, 900	67, 400	93, 300
Crawfish	--------	--------	--------	35, 600	--------	--------	--------
Mussel shells	84, 400	(1)	84, 400	2, 081, 300	--------	--------	--------
Miscellaneous	--------	564, 900	564, 900	--------	--------	201, 200	201, 200
Total	14, 511, 600	7, 541, 600	22, 053, 200	28, 444, 200	17, 533, 200	3, 988, 200	21, 521, 400

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Chubs	--------	--------	--------	100	5, 800	5, 900
Pike or pickerel (jacks)	35, 700	4, 200	39, 900	65, 000	167, 900	232, 900
Sturgeon	--------	1, 200	1, 200	600	700	1, 300
Sucker "mullet"	--------	--------	--------	6, 900	(1)	6, 900
Whitefish, common	19, 000	16, 700	35, 700	148, 100	31, 900	180, 000
Yellow perch	1, 400	(1)	1, 400	3, 200	8, 800	12, 000
Yellow pike	44, 300	14, 400	58, 700	71, 100	207, 300	278, 400
Miscellaneous	--------	36, 600	36, 600	--------	105, 400	105, 400
Total	100, 400	73, 100	173, 500	295, 000	527, 800	822, 800

Species	Lake of the Woods			Total, all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	--------	38, 200	38, 200	8, 508, 800	2, 405, 100	10, 913, 900
Bowfin	--------	--------	--------	9, 000	(1)	9, 000
Buffalofish	--------	--------	--------	1, 000	(1)	1, 000
Burbot	91, 300	(1)	91, 300	395, 500	(1)	395, 500
Carp	11, 300	1, 700	13, 000	3, 846, 500	738, 100	4, 584, 600
Catfish and bullheads	46, 000	12, 200	58, 200	789, 200	256, 200	1, 045, 400
Chubs	--------	--------	--------	7, 148, 800	861, 500	8, 010, 300
Cisco	--------	--------	--------	111, 000	236, 300	347, 300
Crappie	1, 000	(1)	1, 000	1, 000	(1)	1, 000
Eels	--------	--------	--------	65, 300	54, 000	119, 300
Goldfish	--------	--------	--------	67, 800	(1)	67, 800
Lake herring	--------	--------	--------	23, 940, 700	2, 632, 900	26, 573, 600
Lake trout	--------	23, 000	23, 000	10, 111, 700	5, 062, 400	15, 174, 100
Mooneye	500	(1)	500	25, 700	(1)	25, 700
Pike or pickerel (jacks)	349, 500	459, 400	808, 900	558, 800	934, 100	1, 492, 900
Rock bass	--------	--------	--------	23, 200	(1)	23, 200
Sauger	282, 500	3, 700	286, 200	1, 174, 400	3, 700	1, 178, 100
Sheepshead	--------	--------	--------	2, 231, 800	(1)	2, 231, 800
Smelt	--------	--------	--------	1, 029, 300	(1)	1, 029, 300
Steelhead trout	--------	--------	--------	1, 600	(1)	1, 600
Sturgeon	1, 000	300	1, 300	36, 500	54, 800	91, 300
Sucker "mullet"	120, 000	300	120, 300	5, 616, 500	300	5, 616, 800

(1) Where there has been a Canadian catch of these species it is included under Miscellaneous.

Lake fisheries of the United States and Canada, 1934—Continued

CATCH: BY LAKES—Continued

Species	Lake of the Woods			Total, all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Sunfish				17, 900	(1)	17, 900
Tullibees	155, 500	81, 300	236, 800	155, 500	81, 300	236, 800
White bass				687, 900	(1)	687, 900
Whitefish:						
Common	7, 100	336, 800	343, 900	6, 276, 000	4, 030, 800	10, 306, 800
Menominee				229, 000	(1)	229, 000
Yellow perch	43, 700	7, 300	51, 000	16, 099, 400	5, 962, 700	22, 062, 100
Yellow pike	891, 600	830, 700	1, 722, 300	4, 081, 400	1, 864, 500	5, 945, 900
Crawfish				35, 600	(1)	35, 600
Mussel shells				3, 134, 400	(1)	3, 134, 400
Miscellaneous		51, 300	51, 300		2, 558, 500	2, 558, 500
Total	2, 001, 000	1, 846, 200	3, 847, 200	96, 411, 200	27, 737, 200	124, 148, 400

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(1) Where there has been a Canadian catch of these species it is included under Miscellaneous.

Lake fisheries of the United States, 1934

OPERATING UNITS: BY LAKES

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11	275	248	1, 038	131		1, 703
On boats and shore:							
Regular	111	731	887	968	729	103	3, 529
Casual	83	498	158	1, 266	342		2, 347
Total	205	1, 504	1, 293	3, 272	1, 202	103	7, 579
Vessels:							
Steam		22	9	39	6		76
Net tonnage		602	125	874	115		1, 716
Motor	3	33	52	291	35		414
Net tonnage	42	285	640	3, 313	301		4, 581
Total vessels	3	55	61	330	41		490
Total net tonnage	42	887	765	4, 187	416		6, 297
Boats:							
Motor	67	276	299	704	295	79	1, 720
Other	61	210	125	527	421	6	1, 350
Accessory boats			3	12	3		18
Apparatus:							
Haul seines	3	130	63	48	10		254
Length, yards	260	56, 531	27, 258	13, 066	1, 233		98, 348
Gill nets:							
"Shoal", 2¼ to 3⅞ inches	1, 962	14, 275	2, 115	22, 198	6, 504		47, 054
Square yards	242, 650	1, 871, 367	576, 860	4, 711, 827	1, 628, 075		9, 030, 779
"Shoal", 4 to 6 inches	379	6, 661	5, 823	29, 930	7, 921	244	50, 958
Square yards	73, 050	1, 606, 510	1, 606, 150	8, 030, 696	2, 299, 188	77, 940	13, 693, 534
Trammel nets		116		7			123
Square yards		4, 640		660			5, 300
Lines:							
Troll					31		31
Hooks					31		31
Trot	63	39	361	643	1, 203		2, 309
Hooks	32, 010	5, 750	135, 600	291, 610	261, 985		726, 955
Pound nets		34	394	735	110	70	1, 343
Trap nets	192	3, 986	2, 778	601	108		7, 665
Fyke nets	113	802	339	1, 429	45	93	2, 821
Crawfish pots				2, 710			2, 710
Crowfoot bars		4	5	676			685
Picks		3	7	132			142
Diving outfits				16			16

Lake fisheries of the United States, 1934—Continued

OPERATING UNITS: BY STATES AND LAKES

Item	New York			Pennsylvania	Ohio
	Lake Ontario	Lake Erie	Total	Lake Erie	Lake Erie
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11	67	78	111	97
On boats and shore:					
Regular	111	2	113	41	567
Casual	83	8	91	56	347
Total	205	77	282	208	1, 011
Vessels:					
Steam	----------	4	4	12	6
Net tonnage	----------	94	94	307	201
Motor	3	11	14	9	13
Net tonnage	42	75	117	80	130
Total vessels	3	15	18	21	19
Total net tonnage	42	169	211	387	331
Boats:					
Motor	67	2	69	26	216
Other	61	7	68	41	100
Apparatus:					
Haul seines	3	----------	3	11	78
Length, yards	260	----------	260	1, 210	43, 672
Gill nets:					
"Shoal", 2¼ to 3⅞ inches	1, 962	1, 544	3, 506	5, 762	6, 934
Square yards	242, 650	207, 060	449, 710	646, 633	1, 013, 154
"Shoal", 4 to 6 inches	379	2, 342	2, 721	3, 542	760
Square yards	73, 050	579, 490	652, 540	903, 620	120, 000
Trammel nets	----------	----------	----------	----------	116
Square yards	----------	----------	----------	----------	4, 640
Lines:					
Trot	63	2	65	32	----------
Hooks	32, 010	350	32, 360	4, 800	----------
Pound nets	----------	----------	----------	28	6
Trap nets	192	----------	192	67	3, 798
Fyke nets	113	----------	113	----------	243

Item	Michigan					Indiana
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	Lake Michigan
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	----------	248	454	92	794	18
On boats and shore:						
Regular	121	887	514	327	1, 849	23
Casual	87	158	637	92	974	61
Total	208	1, 293	1, 605	511	3, 617	102
Vessels:						
Steam	----------	9	19	6	34	1
Net tonnage	----------	125	338	115	578	22
Motor	----------	52	116	20	188	4
Net tonnage	----------	640	1, 155	166	1, 961	57
Total vessels	----------	61	135	26	222	5
Total net tonnage	----------	765	1, 493	281	2, 539	79
Boats:						
Motor	32	299	408	170	909	56
Other	62	125	315	47	549	1
Accessory boats	----------	3	11	2	16	----------
Apparatus:						
Haul seines	41	63	----------	10	114	----------
Length, yards	11, 649	27, 258	----------	1, 233	40, 140	----------
Gill nets:						
"Shoal", 2¼ to 3⅞ inches	35	2, 115	5, 531	2, 030	9, 711	848
Square yards	4, 520	576, 860	1, 142, 134	318, 845	2, 042, 359	200, 968
"Shoal", 4 to 6 inches	17	5, 823	17, 326	4, 746	27, 912	687
Square yards	3, 400	1, 606, 150	4, 569, 611	1, 302, 073	7, 481, 234	206, 240
Lines:						
Troll	----------	----------	----------	31	31	----------
Hooks	----------	----------	----------	31	31	----------
Trot	5	361	165	747	1, 278	----------
Hooks	600	135, 600	132, 610	219, 260	488, 070	----------
Pound nets	----------	394	437	49	880	5
Trap nets	121	2, 778	601	108	3, 608	----------
Fyke nets	559	339	56	35	989	----------
Crowfoot bars	4	5	596	----------	605	42
Picks	3	7	132	----------	142	----------
Diving outfits	----------	----------	16	----------	16	----------

Lake fisheries of the United States, 1934—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	Illinois	Wisconsin			Minnesota		
	Lake Michigan	Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	72	494	39	533	--------	--------	--------
On boats and shore:							
Regular	9	422	107	529	295	103	398
Casual	--------	568	86	654	164	--------	164
Total	81	1,484	232	1,716	459	103	562
Vessels:							
Steam	--------	19	--------	19	--------	--------	--------
Net tonnage	--------	514	--------	514	--------	--------	--------
Motor	18	153	15	168	--------	--------	--------
Net tonnage	251	1,850	135	1,985	--------	--------	--------
Total vessels	18	172	15	187	--------	--------	--------
Total net tonnage	251	2,364	135	2,499	--------	--------	--------
Boats:							
Motor	4	236	61	297	64	79	143
Other	1	210	47	257	327	6	333
Accessory boats	--------	1	1	2	--------	--------	--------
Apparatus:							
Haul seines	--------	48	--------	48	--------	--------	--------
Length, yards	--------	13,066	--------	13,066	--------	--------	--------
Gill nets:							
"Shoal", 2¼ to 3⅞ inches	2,034	13,785	1,108	14,893	3,366	--------	3,366
Square yards	488,920	2,879,805	370,750	3,250,555	938,480	--------	938,480
"Shoal", 4 to 6 inches	1,014	10,903	1,735	12,638	1,440	244	1,684
Square yards	260,860	2,993,985	421,115	3,415,100	576,000	77,940	653,940
Trammel nets	--------	7	--------	7	--------	--------	--------
Square yards	--------	660	--------	660	--------	--------	--------
Lines:							
Trot	--------	478	93	571	363	--------	363
Hooks	--------	159,000	28,205	187,205	14,520	--------	14,520
Pound nets	--------	293	61	354	--------	70	70
Fyke nets	--------	1,373	10	1,383	--------	93	93
Crawfish nets	--------	2,710	--------	2,710	--------	--------	--------
Crowfoot bars	--------	38	--------	38	--------	--------	--------

OPERATING UNITS OF LAKE ONTARIO:[1] BY GEAR

Item	Haul seines	Gill nets		Trot lines	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal", 2¼ to 3⅞ inches	"Shoal", 4 to 6 inches				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	11	--------	--------	--------	--------	11
On boats and shore:							
Regular	--------	33	29	2	70	14	111
Casual	6	15	11	52	8	1	83
Total	6	59	40	54	78	15	205
Vessels:							
Motor	--------	3	--------	--------	--------	--------	3
Net tonnage	--------	42	--------	--------	--------	--------	42
Boats:							
Motor	--------	26	22	8	30	6	67
Other	3	5	2	46	5	4	61
Apparatus:							
Number	3	1,962	379	63	192	113	2,712
Length, yards	260	--------	--------	--------	--------	--------	--------
Square yards	--------	242,650	73,050	--------	--------	--------	--------
Hooks	--------	--------	--------	32,010	--------	--------	--------

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[1] Includes Niagara River below the Falls and the St. Lawrence River.

Lake fisheries of the United States, 1934—Continued

OPERATING UNITS OF LAKE ERIE:[1] BY GEAR

Item	Haul seines	Gill nets		Trammel nets	Trot lines	Pound nets
		"Shoal", 2¼ to 3⅞ inches	"Shoal", 4 to 6 inches			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	----------	267	187	----------	----------	----------
On boats and shore:						
Regular	162	55	17	10	3	22
Casual	194	47	7	9	28	----------
Total	356	369	211	19	31	22
Vessels:						
Steam	----------	21	19	----------	----------	----------
Net tonnage	----------	585	528	----------	----------	----------
Motor	----------	32	18	----------	----------	----------
Net tonnage	----------	279	140	----------	----------	----------
Total vessels	----------	53	37	----------	----------	----------
Total net tonnage	----------	864	668	----------	----------	----------
Boats:						
Motor	26	33	10	8	7	5
Other	134	19	1	2	24	4
Apparatus:						
Number	130	14,275	6,661	116	39	34
Length, yards	56,531	----------	----------	----------		----------
Square yards	----------	1,871,367	1,606,510	4,640	----------	----------
Hooks	----------	----------	----------	----------	5,750	----------

Item	Trap nets	Fyke nets	Crowfoot bars	Picks	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	----------	----------	----------	----------	----------	275
On boats and shore:						
Regular	477	105	----------	----------	----------	731
Casual	37	19	2	3	174	498
Total	514	124	2	3	174	1,504
Vessels:						
Steam	----------	----------	----------	----------	----------	22
Net tonnage	----------	----------	----------	----------	----------	602
Motor	----------	----------	----------	----------	----------	33
Net tonnage	----------	----------	----------	----------	----------	285
Total vessels	----------	----------	----------	----------	----------	55
Total net tonnage	----------	----------	----------	----------	----------	887
Boats:						
Motor	177	35	1	----------	----------	276
Other	11	25	1	2	8	210
Apparatus, number	3,986	802	4	3	----------	----------

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[1] Includes Niagara River above the Falls.

Lake fisheries of the United States, 1934—Continued

OPERATING UNITS OF LAKE HURON: BY GEAR

Item	Haul seines	Gill nets		Trot lines	Pound nets	Trap nets	Fyke nets	Crow-foot bars	Picks	By hand	Total, exclusive of duplication
		"Shoal", 2¼ to 3⅞ inches	"Shoal". 4 to 6 inches								
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	------	58	134	88	14	57	------	------	------	------	248
On boats and shore:											
Regular	107	58	113	56	157	626	59	------	------	------	887
Casual	85	24	16	7	4	8	6	5	7	15	158
Total	192	140	263	151	175	691	65	5	7	15	1, 293
Vessels:											
Steam	------	3	6	4	1	------	------	------	------	------	9
Net tonnage	------	30	65	71	5	------	------	------	------	------	125
Motor	------	10	28	14	3	17	------	------	------	------	52
Net tonnage	------	142	368	263	22	127	------	------	------	------	640
Total vessels	------	13	34	18	4	17	------	------	------	------	61
Total net tonnage	------	172	433	334	27	127	------	------	------	------	765
Boats:											
Motor	37	31	51	18	51	187	18	1	------	------	299
Other	31	14	9	7	10	50	16	4	7	9	125
Accessory boats	------	------	------	------	3	------	------	------	------	------	3
Apparatus:											
Number	63	2, 115	5, 823	361	394	2, 778	339	5	7	------	------
Length, yards	27, 258	------	------	------	------	------	------	------	------	------	------
Square yards	------	576, 860	1, 606, 150	------	------	------	------	------	------	------	------
Hooks	------	------	------	135, 600	------	------	------	------	------	------	------

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR

Item	Haul seines	Gill nets		Trammel nets	Trot lines lines	Pound nets
		"Shoal", 2¼ to 3⅞ inches	"Shoal". 4 to 6 inches			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	2	611	715	------	215	136
On boats and shore:						
Regular	79	267	377	2	38	438
Casual	43	300	337	8	32	53
Total	124	1, 178	1, 429	10	285	627
Vessels:						
Steam	------	24	31	------	13	1
Net tonnage	------	515	628	------	369	9
Motor	1	169	188	------	55	50
Net tonnage	7	2, 047	2, 192	------	672	366
Total vessels	1	193	219	------	68	51
Total net tonnage	7	2, 562	2, 820	------	1, 041	375
Boats:						
Motor	14	182	160	------	34	168
Other	42	111	55	7	12	26
Accessory boats	1	------	------	------	------	10
Apparatus:						
Number	48	22, 198	29, 930	7	643	735
Length, yards	13, 066	------	------	------	------	------
Square yards	------	4, 711, 827	8, 030, 696	660	------	------
Hooks	------	------	------	------	291, 610	------

Lake fisheries of the United States, 1934—Continued

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR—Continued

Item	Trap nets	Fyke nets	Craw-fish pots	Crow-foot bars	Picks	Diving outfits	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	58	50	2	--------	--------	--------	--------	1, 038
On boats and shore:								
Regular	229	185	6	--------	--------	--------	--------	968
Casual	7	46	28	449	132	32	119	1, 266
Total	294	281	36	449	132	32	119	3, 272
Vessels:								
Steam	--------	--------	--------	--------	--------	--------	--------	39
Net tonnage	--------	--------	--------	--------	--------	--------	--------	874
Motor	18	23	1	--------	--------	--------	--------	291
Net tonnage	131	182	5	--------	--------	--------	--------	3, 313
Total vessels	18	23	1	--------	--------	--------	--------	330
Total net tonnage	131	182	5	--------	--------	--------	--------	4, 187
Boats:								
Motor	80	76	4	241	--------	11	--------	704
Other	19	46	24	129	87	21	47	527
Accessory boats	4	--------	--------	--------	--------	--------	--------	12
Apparatus, number	601	1, 429	2, 710	676	132	16	--------	--------

OPERATING UNITS OF LAKE SUPERIOR: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal", 2¼ to 3⅞ inches	"Shoal", 4 to 6 inches	Troll	Trot				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	--------	70	110	--------	65	10	3	7	131
On boats and shore:									
Regular	10	469	422	8	247	79	59	14	729
Casual	12	226	177	5	36	6	3	2	342
Total	22	765	709	13	348	95	65	23	1, 202
Vessels:									
Steam	--------	2	7	--------	4	--------	--------	--------	6
Net tonnage	--------	30	129	--------	75	--------	--------	--------	115
Motor	--------	22	26	--------	18	4	1	3	35
Net tonnage	--------	199	235	--------	179	30	9	21	301
Total vessels	--------	24	33	--------	22	4	1	3	41
Total net tonnage	--------	229	364	--------	254	30	9	21	416
Boats:									
Motor	2	169	200	7	115	34	23	7	295
Other	8	346	173	--------	31	13	--------	5	421
Accessory boats	--------	--------	--------	--------	--------	2	1	--------	3
Apparatus:									
Number	10	6, 504	7, 921	31	1, 203	110	108	45	--------
Length, yards	1, 233	--------	--------	--------	--------	--------	--------	--------	--------
Square yards	--------	1,628,075	2,299,188	--------	--------	--------	--------	--------	--------
Hooks	--------	--------	--------	31	261, 985	--------	--------	--------	--------

Lake fisheries of the United States, 1934—Continued

OPERATING UNITS OF LAKE OF THE WOODS, RAINY LAKE, AND NAMAKAN LAKE: BY GEAR

Item	Gill nets, "Shoal", 4 to 6 inches	Pound nets	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*
Fishermen:				
On boats and shore, regular	63	36	26	103
Boats:				
Motor	62	17	20	79
Other		6		6
Apparatus:				
Number	244	70	93	
Square yards	77, 940			

CATCH: BY GEAR

Species	New York							
	Haul seines		Gill nets		Trot lines		Trap nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			606, 500	$37, 900			5, 600	$385
Bowfin							500	5
Burbot			10, 200	229			200	5
Carp	19, 100	$924	5, 300	135			10, 500	130
Catfish and bullheads	1, 200	90	2, 800	222			58, 500	4, 656
Cisco			10, 100	1, 000				
Eels					2, 500	$100	56, 100	1, 680
Lake herring			115, 700	10, 400			10, 600	960
Lake trout			5, 100	660			8, 600	1, 100
Mooneye			200	3				
Pike or pickerel (jacks)			500	35			13, 100	920
Rock bass			600	28			5, 500	116
Sturgeon			2, 800	810	20, 300	5, 640	400	39
Sucker "mullet"	25, 800	1, 360	21, 500	600			35, 300	815
Sunfish							17, 200	350
White bass			2, 300	75			100	3
Whitefish, common			44, 900	6, 080			73, 300	8, 800
Yellow perch			143, 400	6, 040			24, 000	1, 372
Yellow pike			2, 900	280			35, 500	3, 362
Total	46, 100	2, 374	974, 800	64, 497	22, 800	5, 740	355, 000	24, 698

Species	New York—Continued				Pennsylvania			
	Fyke nets		Total		Gill nets		Pound nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			612, 100	$38, 285	1, 856, 300	$88, 180	72, 600	$2, 900
Bowfin			500	5				
Burbot			10, 400	234				
Carp	200	$2	35, 100	1, 191			1, 800	54
Catfish and bullheads	12, 100	950	74, 600	5, 918			2, 700	135
Cisco			10, 100	1, 000	59, 000	5, 900	11, 000	1, 100
Eels	6, 300	190	64, 900	1, 970				
Lake herring			126, 300	11, 360				
Lake trout			13, 700	1, 760	200	20	100	10
Mooneye			200	3				
Pike or pickerel (jacks)	1, 300	90	14, 900	1, 045				
Rock bass			6, 100	144				
Sheepshead							9, 000	180
Sturgeon			23, 500	6, 489			1, 000	330
Sucker "mullet"	9, 300	190	91, 900	2, 965			13, 700	290
Sunfish	700	14	17, 900	364				
White bass			2, 400	78			53, 700	2, 150
Whitefish:								
Common			118, 200	14, 880	427, 100	59, 750	33, 300	4, 340
Menominee	200	12	200	12				
Yellow perch	2, 700	165	170, 100	7, 577	546, 000	20, 500	163, 400	6, 530
Yellow pike			38, 400	3, 642			10, 200	1, 020
Total	32, 800	1, 613	1, 431, 500	98, 922	2, 888, 600	174, 350	372, 500	19, 039

Lake fisheries of the United States, 1934—Continued

CATCH: BY GEAR—Continued

Species	Pennsylvania—Continued				Ohio			
	Trap nets		Total		Haul seines		Gill nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	202, 700	$10, 135	2, 131, 600	$101, 215	900	$46	153, 300	$8, 127
Bowfin	--------	--------	--------	--------	5, 400	108	--------	--------
Burbot	200	4	200	4	--------	--------	7, 900	191
Carp	100	3	1, 900	57	724, 900	13, 773	1, 800	35
Catfish and bullheads	1, 000	62	3, 700	197	137, 500	8, 623	500	31
Cisco	--------	--------	70, 000	7, 000	--------	--------	23, 000	921
Eels	400	8	400	8	--------	--------	--------	--------
Goldfish	--------	--------	--------	--------	49, 100	368	--------	--------
Lake trout	--------	--------	300	30	--------	--------	--------	--------
Mooneye	--------	--------	--------	--------	18, 300	183	--------	--------
Sauger	--------	--------	--------	--------	8, 800	387	228, 800	10, 067
Sheepshead	1, 500	30	10, 500	210	427, 500	7, 267	6, 000	102
Sturgeon	--------	--------	1, 000	330	--------	--------	10, 100	2, 024
Sucker "mullet"	10, 000	300	23, 700	590	27, 900	559	14, 600	292
White bass	2, 000	80	55, 700	2, 230	22, 500	809	7, 900	283
Whitefish, common	2, 500	350	462, 900	64, 440	--------	--------	34, 700	4, 551
Yellow perch	88, 900	3, 550	798, 300	30, 580	2, 200	90	5, 062, 900	207, 578
Yellow pike	1, 900	190	12, 100	1, 210	6, 700	512	9, 100	694
Total	311, 200	14, 712	3, 572, 300	208, 101	1, 431, 700	32, 725	5, 560, 600	234, 896

Species	Ohio—Continued							
	Trammel nets		Pound nets		Trap nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	--------	--------	--------	--------	5, 606, 000	$297, 118	4, 900	$257
Burbot	--------	--------	--------	--------	239, 700	5, 754	--------	--------
Carp	198, 400	$3, 770	4, 000	$76	101, 400	1, 926	31, 300	595
Catfish and bullheads	500	33	1, 100	43	319, 100	19, 802	38, 500	2, 154
Cisco	--------	--------	--------	--------	7, 100	283	--------	--------
Goldfish	700	5	--------	--------	9, 200	69	1, 100	8
Mooneye	--------	--------	3, 400	34	2, 000	20	700	7
Sauger	--------	--------	--------	--------	488, 400	21, 491	11, 900	522
Sheepshead	900	15	--------	--------	1, 625, 500	27, 634	97, 800	1, 663
Sturgeon	--------	--------	--------	--------	300	57	--------	--------
Sucker "mullet"	--------	--------	9, 200	184	737, 200	14, 744	64, 400	1, 287
White bass	100	4	1, 800	63	495, 600	17, 840	88, 500	3, 186
Whitefish, common	--------	--------	--------	--------	242, 300	31, 740	1, 900	255
Yellow perch	--------	--------	--------	--------	8, 150, 500	333, 456	36, 900	1, 514
Yellow pike	--------	--------	500	38	1, 089, 500	82, 803	61, 400	4, 666
Total	200, 600	3, 827	20, 000	438	19, 113, 500	854, 737	439, 300	16, 114

Species	Ohio—Continued				Michigan			
	By hand		Total		Haul seines		Gill nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	--------	--------	5, 765, 100	$305, 548	--------	--------	--------	--------
Bowfin	--------	--------	5, 400	108	100	$1	--------	--------
Burbot	--------	--------	247, 600	5, 945	100	2	5, 800	$110
Carp	--------	--------	1, 061, 800	20, 175	1, 166, 700	22, 995	5, 100	94
Catfish and bullheads	--------	--------	497, 200	30, 686	15, 100	765	100	5
Chubs	--------	--------	--------	--------	100	9	1, 553, 100	149, 530
Cisco	--------	--------	30, 100	1, 204	--------	--------	--------	--------
Goldfish	--------	--------	60, 100	450	900	7	--------	--------
Lake herring	--------	--------	--------	--------	26, 000	390	2, 626, 000	47, 950
Lake trout	--------	--------	--------	--------	--------	--------	3, 950, 900	493, 090
Mooneye	--------	--------	24, 400	244	--------	--------	--------	--------
Pike or pickerel (jacks)	--------	--------	--------	--------	600	38	2, 900	233
Rock bass	--------	--------	--------	--------	1, 300	64	200	16
Sauger	--------	--------	737, 900	32, 467	1, 000	74	17, 700	2, 016
Sheepshead	--------	--------	2, 157, 700	36, 681	5, 800	99	200	4
Smelt	--------	--------	--------	--------	--------	--------	10, 400	520
Sturgeon	--------	--------	10, 400	2, 081	--------	--------	--------	--------
Sucker "mullet"	--------	--------	853, 300	17, 066	151, 100	3, 748	277, 800	5, 743
White bass	--------	--------	616, 400	22, 185	200	5	100	4
Whitefish:								
Common	--------	--------	278, 900	36, 546	--------	--------	1, 358, 300	169, 800
Menominee	--------	--------	--------	--------	--------	--------	150, 700	8, 045
Yellow perch	--------	--------	13, 252, 500	542, 638	11, 300	734	218, 700	16, 753
Yellow pike	--------	--------	1, 167, 200	88, 713	77, 800	9, 287	127, 400	15, 248
Mussel shells	904, 000	$13, 560	904, 000	13, 560	--------	--------	--------	--------
Pearls and slugs	--------	457	--------	457	--------	--------	--------	--------
Total	904, 000	14, 017	27, 670, 000	1, 156, 754	1, 458, 100	38, 218	10, 305, 400	909, 161

Lake fisheries of the United States, 1934—Continued

CATCH: BY GEAR—Continued

Species	Michigan—Continued							
	Lines				Pound nets		Trap nets	
	Troll		Trot					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot			2,700	$44	100	$2	2,800	$61
Carp					28,700	514	181,400	3,558
Catfish and bullheads			200	10	2,700	135	53,400	2,684
Chubs					7,000	629	600	54
Cisco							800	34
Goldfish							1,200	9
Lake herring					3,660,300	77,810	1,179,900	23,950
Lake trout	5,800	$650	1,567,600	180,445	519,100	62,845	266,800	31,147
Mooneye					300	6	300	3
Pike or pickerel (jacks)					2,600	210	12,400	994
Rock bass					400	32	7,800	566
Sauger					4,800	560	113,800	10,515
Sheepshead					9,900	297	31,700	582
Smelt					2,200	110	3,000	150
Sucker "mullet"					198,800	4,130	2,770,400	66,383
White bass							7,400	266
Whitefish:								
Common			900	116	943,700	122,240	2,581,200	335,036
Menominee					10,100	561	5,600	315
Yellow perch			19,400	1,268	32,000	2,246	500,400	33,483
Yellow pike			700	84	278,300	33,374	1,185,700	142,399
Total	5,800	650	1,591,500	181,967	5,701,000	305,701	8,906,600	652,189

Species	Michigan—Continued							
	Fyke nets		Crowfoot bars		Picks		Diving outfits	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3,000	$30						
Burbot	2,300	31						
Carp	43,600	833						
Catfish and bullheads	47,300	2,407						
Chubs	300	27						
Goldfish	5,600	42						
Lake herring	10,200	234						
Lake trout	2,700	300						
Pike or pickerel (jacks)	5,900	476						
Rock bass	7,400	552						
Sauger	16,700	754						
Sheepshead	16,000	274						
Sucker "mullet"	266,500	5,355						
White bass	5,700	207						
Whitefish:								
Common	6,700	1,053						
Menominee	100	6						
Yellow perch	77,400	4,465						
Yellow pike	162,800	17,323						
Mussel shells			1,237,800	$23,260	251,300	$4,550	35,200	$667
Pearls and slugs				895		173		12
Total	680,200	34,369	1,237,800	24,155	251,300	4,723	35,200	679

Lake fisheries of the United States, 1934—Continued

CATCH: BY GEAR—Continued

Species	Michigan—Continued				Indiana			
	By hand		Total		Gill nets		Pound nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	---------	-------	3,100	$31	-------	-------	-------	-------
Buffalofish	---------	-------	----------	----------	-------	-------	1,000	$45
Burbot	---------	-------	13,800	250	-------	-------	-------	-------
Carp	---------	-------	1,425,500	27,994	-------	-------	2,400	72
Catfish and bullheads	---------	-------	118,800	6,006	-------	-------	-------	-------
Chubs	---------	-------	1,561,100	150,249	352,300	$33,500	-------	-------
Cisco	---------	-------	800	34	-------	-------	-------	-------
Goldfish	---------	-------	7,700	58	-------	-------	-------	-------
Lake herring	---------	-------	7,502,400	150,334	22,000	900	28,000	800
Lake trout	---------	-------	6,312,900	768,477	88,400	9,300	-------	-------
Mooneye	---------	-------	600	9	-------	-------	-------	-------
Pike or pickerel (jacks)	---------	-------	24,400	1,951	-------	-------	-------	-------
Rock bass	---------	-------	17,100	1,230	-------	-------	-------	-------
Sauger	---------	-------	154,000	13,919	-------	-------	-------	-------
Sheepshead	---------	-------	63,600	1,256	-------	-------	-------	-------
Smelt	---------	-------	15,600	780	-------	-------	-------	-------
Steelhead trout	---------	-------	----------	----------	1,600	250	-------	-------
Sucker "mullet"	---------	-------	3,664,600	85,359	-------	-------	600	18
White bass	---------	-------	13,400	482	-------	-------	-------	-------
Whitefish:								
Common	---------	-------	4,890,800	628,245	3,000	360	900	110
Menominee	---------	-------	166,500	8,927	-------	-------	-------	-------
Yellow perch	---------	-------	859,200	58,949	48,500	3,900	1,600	128
Yellow pike	---------	-------	1,832,700	217,715	-------	-------	1,300	140
Mussel shells	219,800	$3,777	1,744,100	32,254	-------	-------	-------	-------
Pearls and slugs	---------	340	----------	1,420	-------	-------	-------	-------
Total	219,800	4,117	30,392,700	2,155,929	515,800	48,210	35,800	1,313

Species	Indiana—Continued						Illinois	
	Crowfoot bars		By hand		Total		Gill nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	-------	-------	-------	-------	1,000	$45	-------	-------
Carp	-------	-------	-------	-------	2,400	72	-------	-------
Chubs	-------	-------	-------	-------	352,300	33,500	827,700	$65,300
Lake herring	-------	-------	-------	-------	50,000	1,700	50,700	1,000
Lake trout	-------	-------	-------	-------	88,400	9,300	225,200	21,800
Steelhead trout	-------	-------	-------	-------	1,600	250	-------	-------
Sucker "mullet"	-------	-------	-------	-------	600	18	-------	-------
Whitefish, common	-------	-------	-------	-------	3,900	470	700	84
Yellow perch	-------	-------	-------	-------	50,100	4,028	102,400	3,600
Yellow pike	-------	-------	-------	-------	1,300	140	-------	-------
Mussel shells	124,000	$1,860	26,000	$390	150,000	2,250	-------	-------
Total	124,000	1,860	26,000	390	701,600	51,773	1,206,700	91,784

Species	Wisconsin							
	Haul seines		Gill nets		Trammel nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	-------	-------	21,700	$217	-------	-------	5,000	$50
Carp	1,223,800	$15,300	12,600	157	17,900	$224	-------	-------
Catfish and bullheads	3,200	210	2,000	130	-------	-------	-------	-------
Chubs	-------	-------	4,354,600	389,315	-------	-------	-------	-------
Lake herring	-------	-------	5,506,000	89,131	-------	-------	-------	-------
Lake trout	-------	-------	2,169,600	247,056	-------	-------	719,700	84,653
Pike or pickerel (jacks)	-------	-------	22,600	1,786	-------	-------	-------	-------
Smelt	-------	-------	264,000	4,000	-------	-------	-------	-------
Sucker "mullet"	13,100	460	397,100	13.737	-------	-------	-------	-------
Whitefish:								
Common	-------	-------	136,500	17,778	-------	-------	-------	-------
Menominee	-------	-------	40,000	2,415	-------	-------	-------	-------
Yellow perch	-------	-------	245,000	13,522	-------	-------	-------	-------
Yellow pike	-------	-------	2,200	221	-------	-------	-------	-------
Total	1,240,100	15,970	13,173,900	779,465	17,900	224	724,700	84,703

Lake fisheries of the United States, 1934—Continued

CATCH: BY GEAR—Continued

Species	Wisconsin—Continued							
	Pound nets		Fyke nets		Crawfish pots		Crowfoot bars	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	1, 500	$15	4, 000	$40	------	------	------	------
Carp	1, 300	16	52, 900	661	------	------	------	------
Catfish and bullheads	700	45	43, 000	2, 800	------	------	------	------
Chubs	11, 700	1, 040	500	45	------	------	------	------
Lake herring	2, 674, 300	46, 702	14, 400	243	------	------	------	------
Lake trout	312, 100	36, 132	100	13	------	------	------	------
Pike or pickerel (jacks)	19, 000	1, 502	27, 500	2, 193	------	------	------	------
Smelt	603, 500	9, 100	146, 200	2, 200	------	------	------	------
Sucker "mullet"	117, 200	2, 804	327, 800	11, 055	------	------	------	------
Whitefish:								
Common	199, 800	25, 647	500	48				
Menominee	19, 600	922	900	54	------	------	------	------
Yellow perch	90, 800	5, 000	482, 700	26, 509	------	------	------	------
Yellow pike	10, 600	1, 081	9, 900	998	------	------	------	------
Crawfish	------	------	------	------	35, 600	$3, 200	------	------
Mussel shells	------	------	------	------	------	------	320, 000	$3, 110
Total	4, 062, 100	130, 006	1, 110, 400	46, 859	35, 600	3, 200	320, 000	3, 110

Species	Wisconsin—Continued				Minnesota			
	By hand		Total		Gill nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	------	------	32, 200	$322	13, 700	$36	------	------
Carp	------	------	1, 308, 500	16, 358	200	3	------	------
Catfish and bullheads	------	------	48, 900	3, 185	5, 600	225	------	------
Chubs	------	------	4, 366, 800	390, 400	40, 800	4, 124	------	------
Lake herring	------	------	8, 194, 700	136, 076	8, 016, 600	139, 729	------	------
Lake trout	------	------	3, 201, 500	367, 854	219, 900	25, 006	49, 800	$5, 539
Mooneye	------	------	------	------	500	6	------	------
Pike or pickerel (jacks)	------	------	69, 100	5, 481	293, 500	6, 340	------	------
Sauger	------	------	------	------	213, 700	8, 546	------	------
Smelt	------	------	1, 013, 700	15, 300	------	------	------	------
Sturgeon	------	------	------	------	200	46	------	------
Sucker "mullet"	------	------	855, 200	28, 056	81, 400	934	------	------
Tullibees	------	------	------	------	152, 400	381	------	------
Whitefish:								
Common	------	------	336, 800	43, 473	103, 100	8, 855		
Menominee	------	------	60, 500	3, 391	1, 800	127	------	------
Yellow perch	------	------	818, 500	45, 031	36, 000	1, 469	------	------
Yellow pike	------	------	22, 700	2, 300	627, 700	49, 265	------	------
Crawfish	------	------	35, 600	3, 200	------	------	------	------
Mussel shells	16, 300	$150	336, 300	3, 260	------	------	------	------
Total	16, 300	150	20, 701, 000	1, 063, 687	9, 807, 100	245, 092	49, 800	5, 539

Species	Minnesota—Continued					
	Pound nets		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	77, 600	$194	------	------	91, 300	$250
Carp	8, 300	83	2, 800	$27	11, 300	113
Catfish and bullheads	600	24	39, 800	1, 590	46, 000	1, 839
Chubs	100	1	------	------	40, 900	4, 125
Crappie	300	20	700	53	1, 000	73
Lake herring	------	------	------	------	8, 016, 600	139, 729
Lake trout	------	------	------	------	269, 700	30, 545
Mooneye	------	------	------	------	500	6
Pike or pickerel (jacks)	118, 400	2, 558	38, 500	800	450, 400	9, 698
Sauger	61, 800	2, 473	7, 000	280	282, 500	11, 299
Sturgeon	1, 400	325	------	------	1, 600	371
Sucker "mullet"	32, 300	496	13, 500	223	127, 200	1, 653
Tullibees	3, 100	8	------	------	155, 500	389
Whitefish:						
Common	77, 200	6, 295	3, 500	280	183, 800	15, 430
Menominee	------	------	------	------	1, 800	127
Yellow perch	4, 300	188	8, 000	321	48, 300	1, 978
Yellow pike	325, 300	25, 816	54, 000	4, 099	1, 007, 000	79, 180
Total	710, 700	38, 481	167, 800	7, 673	10, 735, 400	296, 785

Lake fisheries of the United States, 1934—Continued

CATCH: BY LAKES

Species	Lake Ontario		Lake Erie			
	New York		New York		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	152, 700	$10, 725	459, 400	$27, 560	2, 131, 600	$101, 215
Bowfin	500	5	----------	----------	----------	----------
Burbot	7, 500	205	2, 900	29	200	4
Carp	17, 000	281	18, 100	910	1, 900	57
Catfish and bullheads	72, 300	5, 740	2, 300	178	3, 700	197
Cisco	----------	----------	10, 100	1, 000	70, 000	7, 000
Eels	64, 900	1, 970	----------	----------	400	8
Lake herring	126, 300	11, 360	----------	----------	----------	----------
Lake trout	13, 600	1, 750	100	10	300	30
Mooneye	----------	----------	200	3	----------	----------
Pike or pickerel (jacks)	14, 900	1, 045	----------	----------	----------	----------
Rock bass	5, 600	114	500	30	----------	----------
Sheepshead	----------	----------	----------	----------	10, 500	210
Sturgeon	16, 400	4, 500	7, 100	1, 989	1, 000	330
Sucker "mullet"	47, 300	955	44, 600	2, 010	23, 700	590
Sunfish	17, 900	364	----------	----------	----------	----------
White bass	----------	----------	2, 400	78	55, 700	2, 230
Whitefish:						
Common	83, 600	10, 040	34, 600	4, 840	462, 900	64, 440
Menominee	200	12	----------	----------	----------	----------
Yellow perch	51, 400	3, 105	118, 700	4, 472	798, 300	30, 580
Yellow pike	24, 500	2, 680	13, 900	962	12, 100	1, 210
Total	716, 600	54, 851	714, 900	44, 071	3, 572, 300	208, 101

Species	Lake Erie—Continued					
	Ohio		Michigan		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	5, 765, 100	$305, 548	----------	----------	8, 356, 100	$434, 323
Bowfin	5, 400	108	----------	----------	5, 400	108
Burbot	247, 600	5, 945	2, 100	$50	252, 800	6, 028
Carp	1, 061, 800	20, 175	398, 700	7, 574	1, 480, 500	28, 716
Catfish and bullheads	497, 200	30, 686	64, 400	3, 283	567, 600	34, 344
Cisco	30, 100	1, 204	800	34	111, 000	9, 238
Eels	----------	----------	----------	----------	400	8
Goldfish	60, 100	450	7, 700	58	67, 800	508
Lake trout	----------	----------	800	87	1, 200	127
Mooneye	24, 400	244	300	3	24, 900	250
Pike or pickerel (jacks)	----------	----------	500	20	500	20
Rock bass	----------	----------	2, 700	82	3, 200	112
Sauger	737, 900	32, 467	47, 400	2, 080	785, 300	34, 547
Sheepshead	2, 157, 700	36, 681	50, 000	848	2, 218, 200	37, 739
Sturgeon	10, 400	2, 081	----------	----------	18, 500	4, 400
Sucker "mullet"	853, 300	17, 066	95, 100	1, 899	1, 016, 700	21, 565
White bass	616, 400	22, 185	13, 200	474	687, 700	24, 967
Whitefish, common	278, 900	36, 546	1, 000	136	777, 400	105, 962
Yellow perch	13, 252, 500	542, 638	49, 900	2, 146	14, 219, 400	579, 836
Yellow pike	1, 167, 200	88, 713	52, 700	3, 999	1, 245, 900	94, 884
Mussel shells [1]	904, 000	13, 560	64, 700	1, 120	968, 700	14, 680
Pearls and slugs [1]	----------	457	----------	449	----------	906
Total	27, 670, 000	1, 156, 754	852, 000	24, 342	32, 809, 200	1, 433, 268

[1] From tributary streams.

Lake fisheries of the United States, 1934—Continued

CATCH: BY LAKES—Continued

Species	Lake Huron		Lake Michigan			
	Michigan		Michigan		Indiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3, 100	$31				
Buffalofish					1, 000	$45
Burbot	2, 100	21	7, 800	$161		
Carp	1, 015, 200	20, 304	10, 200	102	2, 400	72
Catfish and bullheads	50, 800	2, 540	3, 300	165		
Chubs	413, 700	37, 232	973, 900	97, 390	352, 300	33, 500
Lake herring	4, 371, 300	87, 434	1, 063, 400	31, 880	50, 000	1, 700
Lake trout	1, 521, 500	174, 990	2, 365, 100	295, 640	88, 400	9, 300
Mooneye	300	6				
Pike or pickerel (jacks)	7, 500	604	14, 500	1, 175		
Rock bass	12, 800	1, 020	1, 400	112		
Sauger	73, 200	8, 056	31, 300	3, 552		
Sheepshead	4, 300	129	9, 300	279		
Smelt			15, 600	780		
Steelhead trout					1, 600	250
Sucker "mullet"	2, 198, 100	57, 160	1, 276, 500	24, 400	600	18
White bass	100	4	100	4		
Whitefish:						
Common	2, 565, 800	333, 513	1, 931, 200	231, 744	3, 900	470
Menominee	52, 600	3, 155	105, 400	5, 270		
Yellow perch	519, 400	33, 600	285, 800	22, 878	50, 100	4, 028
Yellow pike	1, 615, 400	193, 814	157, 400	18, 800	1, 300	140
Mussel shells [1]	84, 400	1, 210	1, 595, 000	29, 924	150, 000	2, 250
Pearls and slugs [1]		40		931		
Total	14, 511, 600	954, 863	9, 847, 200	765, 187	701, 600	51, 773

Species	Lake Michigan—Continued					
	Illinois		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish					1, 000	$45
Burbot			32, 200	$322	40. 000	483
Carp			1, 308, 500	16, 358	1, 321, 100	16, 532
Catfish and bullheads			48, 900	3, 185	52. 200	3, 350
Chubs	827, 700	$65, 300	4, 108, 300	369, 725	6, 262, 200	565, 915
Lake herring	50, 700	1, 000	5, 248, 300	91, 880	6, 412, 400	126, 460
Lake trout	225, 200	21, 800	2, 590, 400	309, 800	5, 269, 100	636, 540
Pike or pickerel (jacks)			65, 400	5, 260	79, 900	6, 435
Rock bass					1, 400	112
Sauger					31, 300	3, 552
Sheepshead					9, 300	279
Smelt			1, 013, 700	15. 300	1, 029, 300	16, 080
Steelhead trout					1, 600	250
Sucker "mullet"			785, 700	27, 360	2, 062, 800	51, 778
White bass					100	4
Whitefish:						
Common	700	84	246, 000	34, 400	2, 181, 800	266, 698
Menominee			47, 500	2, 874	152. 900	8. 144
Yellow perch	102, 400	3, 600	817, 900	45, 000	1, 256, 200	75, 506
Yellow pike			4, 000	434	162, 700	19, 374
Crawfish			35, 600	3, 200	35, 600	3, 200
Mussel shells [1]			336, 300	3, 260	2, 081, 300	35, 434
Pearls and slugs [1]						931
Total	1, 206, 700	91, 784	16, 688, 700	928, 358	28, 444, 200	1, 837, 102

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[1] From tributary streams.

Lake fisheries of the United States, 1934—Continued

CATCH: BY LAKES—Continued

Species	Lake Superior					
	Michigan		Wisconsin		Minnesota	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	1,800	$18				
Carp	1,400	14				
Catfish and bullheads	300	18				
Chubs	173,500	15,627	258,500	$20,675	40,800	$4,124
Lake herring	2,067,700	31,020	2,946,400	44,196	8,016,600	139,729
Lake trout	2,425,500	297,760	611,100	58,054	269,700	30,545
Pike or pickerel (jacks)	1,900	152	3,700	221	200	12
Rock bass	200	16				
Sauger	2,100	231				
Sucker "mullet"	94,900	1,900	69,500	696	300	6
Whitefish:						
Common	392,800	62,852	90,800	9,073	9,600	1,345
Menominee	8,500	502	13,000	517	1,800	127
Yellow perch	4,100	325	600	31		
Yellow pike	7,200	1,102	18,700	1,866		
Total	5,181,900	411,537	4,012,300	135,329	8,339,000	175,888

Species	Lake Superior—Total		Lake of the Woods, Rainy Lake, and Namakan Lake		Total, all lakes	
			Minnesota			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					8,508,800	$445,048
Bowfin					9,000	144
Buffalofish					1,000	45
Burbot	1,800	$18	91,300	$230	395,500	6,985
Carp	1,400	14	11,300	113	3,846,500	65,960
Catfish and bullheads	300	18	46,000	1,839	789,200	47,831
Chubs	472,800	40,426	100	1	7,148,800	643,574
Cisco					111,000	9,238
Crappie			1,000	73	1,000	73
Eels					65,300	1,978
Goldfish					67,800	508
Lake herring	13,030,700	214,945			23,940,700	440,199
Lake trout	3,306,300	386,359			10,111,700	1,199,766
Mooneye			500	6	25,700	262
Pike or pickerel (jacks)	5,800	385	450,200	9,686	558,800	18,175
Rock bass	200	16			23,200	1,374
Sauger	2,100	231	282,500	11,299	1,174,400	57,685
Sheepshead					2,231,800	38,147
Smelt					1,029,300	16,080
Steelhead trout					1,600	250
Sturgeon			1,600	371	36,500	9,271
Sucker "mullet"	164,700	2,602	126,900	1,647	5,616,500	135,707
Sunfish					17,900	364
Tullibees			155,500	389	155,500	389
White bass					687,900	24,975
Whitefish:						
Common	493,200	73,270	174,200	14,085	6,276,000	803,568
Menominee	23,300	1,146			229,000	12,457
Yellow perch	4,700	356	48,300	1,978	16,099,400	694,381
Yellow pike	25,900	2,968	1,007,000	79,180	4,081,400	392,900
Crawfish					35,600	3,200
Mussel shells [1]					3,134,400	51,324
Pearls and slugs [1]						1,877
Total	17,533,200	722,754	2,396,400	120,897	96,411,200	5,123,735

[1] From tributary streams.

Industries related to the fisheries of the Lake States, 1934

OPERATING UNITS, SALARIES, AND WAGES

Items	New York	Pennsylvania	Ohio	Michigan	Indiana and Illinois	Wisconsin	Minnesota	Total
Transporting:								
Persons engaged, on vessels	*Number* ----	*Number* ----	*Number* 12	*Number* 3	*Number* ----	*Number* ----	*Number* ----	*Number* 15
Vessels, motor	----	----	7	1	----	----	----	8
Net tonnage	----	----	93	21	----	----	----	114
Wholesale and manufacturing:								
Establishments	15	7	48	58	56	43	11	238
Persons engaged:								
Proprietors	13	9	45	45	26	29	6	173
Salaried employees	26	7	72	81	227	74	34	521
Wage earners:								
Average for season	109	73	442	434	458	568	89	2,173
Average for year	64	28	239	190	383	201	47	1,152
Paid to salaried employees	$36,186	$18,752	$175,880	$136,311	$561,706	$83,855	$38,466	$1,051,156
Paid to wage earners	$74,940	$31,187	$302,250	$196,739	$535,691	$201,532	$49,384	$1,391,723
Total salaries and wages	$111,126	$49,939	$478,130	$333,050	$1,097,397	$285,387	$87,850	$2,442,879
Fishermen manufacturing	----	----	----	72	----	121	342	535

PRODUCTS MANUFACTURED

Item	New York		Pennsylvania		Ohio		Michigan	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Carp, smoked ... pounds	----	----	----	----	4,600	$950	(1)	(1)
Chubs, smoked ... do	(1)	(1)	----	----	115,400	21,750	500,600	$132,364
Cisco, smoked ... do	----	----	----	----	(1)	(1)	----	----
Lake herring:								
Fresh fillets ... do	----	----	----	----	----	----	(1)	(1)
Salted ... do	----	----	----	----	----	----	1,462,900	54,103
Smoked ... do	(1)	(1)	----	----	----	----	(1)	(1)
Lake trout:								
Fresh fillets ... do	----	----	(1)	(1)	----	----	----	----
Smoked ... do	----	----	----	----	3,500	1,175	62,230	13,545
Pike:								
Fresh fillets ... do	194,326	$37,721	272,256	$50,721	877,288	162,443	----	----
Frozen fillets ... do	(1)	(1)	91,954	17,243	287,157	50,621	----	----
Salmon:								
Smoked ... do	(1)	(1)	----	----	23,800	5,860	(1)	(1)
Sturgeon, smoked ... do	(1)	(1)	----	----	12,160	8,605	----	----
Tullibees, smoked ... do	(1)	(1)	----	----	249,400	43,860	(1)	(1)
White bass,								
Fresh fillets ... do	----	----	(1)	(1)	18,173	2,571	----	----
Frozen fillets ... do	----	----	(1)	(1)	7,108	794	----	----
Whitefish, smoked ... do	(1)	(1)	----	----	57,100	11,975	50,530	10,720
Yellow perch:								
Fresh fillets ... do	22,670	4,770	69,611	13,210	1,148,346	200,028	(1)	(1)
Frozen fillets ... do	----	----	9,587	1,780	207,123	35,186	----	----
Unclassified products:								
Fillets, fresh and frozen ... pounds	(2)	(2)	[3] 6,440	[3] 1,082	(2)	(2)	[4] 98,725	[4] 10,063
Smoked ... do	(2)	(2)	----	----	(2)	(2)	[6] 188,540	[6] 48,196
Miscellaneous	[9] 237,600	[9] 51,960	----	----	[10] 27,723	[10] 5,543	----	----
Total	454,596	94,451	449,848	84,036	3,038,878	551,361	2,363,525	268,991
By fishermen:								
Lake herring, salted pounds	----	----	----	----	----	----	251,300	8,795
Lake trout, salted ... do	----	----	----	----	----	----	25,000	1,240
Total ... do	----	----	----	----	----	----	276,300	10,035
Grand total ... do	454,596	94,451	449,848	84,036	3,038,878	551,361	2,639,825	279,026

See footnotes at end of table.

Industries related to the fisheries of the Lake States, 1934—Continued

PRODUCTS MANUFACTURED—Continued

Item	Illinois		Wisconsin		Minnesota	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:						
Alewives:						
Pickled……pounds	202,500	$28,750	----------	----------	(1)	(1)
Spiced……do	----------	----------	383,500	$54,925	----------	----------
Carp, smoked……do	(1)	(1)	----------	----------	----------	----------
Chubs, smoked……do	1,653,290	379,319	901,297	176,692	23,600	$4,160
Cisco, smoked……do	17,545	4,564	----------	----------	----------	----------
Lake herring:						
Fresh fillets……do	----------	----------	136,610	12,761	----------	----------
Salted……	----------	----------	2,393,180	78,652	----------	----------
Smoked……do	(1)	(1)	675,000	44,250	(1)	(1)
Lake trout:						
Fresh fillets……do	(1)	(1)	9,824	2,141	----------	----------
Smoked……do	78,256	19,128	177,120	35,574	(1)	(1)
Pike:						
Fresh fillets……do	680,850	139,003	122,339	28,003	----------	----------
Frozen fillets……do	(1)	(1)	----------	----------	----------	----------
Salmon:						
Smoked……do	628,400	219,625	77,977	12,850	(1)	(1)
Kippered……do	24,454	7,850	----------	----------	(1)	(1)
Sturgeon, smoked……do	3,157	2,479	----------	----------	----------	----------
Tullibees, smoked……do	91,444	17,423	(1)	(1)	(1)	(1)
White bass, fresh fillets……do	(1)	(1)	----------	----------	----------	----------
Whitefish, smoked……do	(1)	(1)	(1)	(1)	(1)	(1)
Yellow perch:						
Fresh fillets……do	1,243,739	246,700	176,193	38,306	----------	----------
Frozen fillets……do	(1)	(1)	----------	----------	----------	----------
Unclassified products:						
Fillets, fresh and frozen……do	[5] 152,817	[5] 30,691	(2)	(2)	----------	----------
Smoked……do	[7] 30,886	[7] 6,623	[8] 41,764	[8] 6,702	(2)	(2)
Miscellaneous……	----------	----------	----------	[11] 61,855	----------	[12] 38,170
Total……	4,807,338	1,102,155	----------	552,711	----------	42,330
By fishermen:						
Chubs, smoked……pounds	----------	----------	26,000	4,940	----------	----------
Lake herring, salted……do	----------	----------	892,540	31,425	600,000	21,000
Lake trout, smoked……do	----------	----------	2,500	450	----------	----------
Total……do	----------	----------	921,040	36,815	600,000	21,000
Grand total……do	4,807,338	1,102,155	----------	589,526	----------	63,330

[1] This item has been included under "Unclassified products."

[2] The production of this item is included under "Miscellaneous."

[3] Includes fresh fillets of lake trout, sheepshead, white bass and whitefish; and frozen fillets of sheepshead and white bass.

[4] Includes fresh fillets of lake herring and yellow perch; and frozen fillets of lake herring.

[5] Includes fresh fillets of lake trout, white bass and whitefish; and frozen fillets of pike and yellow perch.

[6] Includes smoked carp, lake herring, mackerel, menominee, salmon, and tullibees.

[7] Includes smoked buffalofish, carp, lake herring, sablefish, shad, and whitefish.

[8] Includes smoked carp, tullibees, and whitefish.

[9] Includes frozen fillets of pike; and smoked butterfish, chubs, eels, lake herring, salmon, sturgeon, tullibees, and whitefish.

[10] Includes fresh and frozen fillets of sheepshead; and smoked cisco and sablefish.

[11] Includes fresh fillets of whitefish; spiced chubs and sea herring; Bismarck herring; canned whitefish caviar; burbot liver oil; and mussel-shell products.

[12] Includes smoked lake herring, lake trout, salmon, tullibees, and whitefish; kippered salmon; pickled alewives; and burbot liver oil.

NOTE.—The total value of the manufactured products for the Lake States was as follows: By manufacturing establishments, $2,696,035; and by fishermen, $67,850. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 224 have also been included as fishermen and 6 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Lake fisheries of the United States and Canada, 1933

CATCH: BY LAKES

Species	Lake Ontario			Lake Erie		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	226, 800	62, 000	288, 800	8, 786, 400	4, 151, 600	12, 938, 000
Bowfin	700	(1)	700	400	(1)	400
Burbot	700	(1)	700	251, 800	(1)	251, 800
Carp	6, 300	98, 300	104, 600	2, 067, 300	580, 700	2, 648, 000
Catfish and bullheads	68, 600	192, 000	260, 600	996, 900	100, 000	1, 096, 900
Cisco				135, 500	177, 700	313, 200
Eels	40, 200	65, 900	106, 100			
Goldfish				99, 500	(1)	99, 500
Lake herring	41, 700	780, 300	822, 000			
Lake trout	12, 400	353, 200	365, 600	4, 500	1, 500	6, 000
Mooneye				5, 800	(1)	5, 800
Pike or pickerel (jacks)	2, 900	191, 800	194, 700	5, 900	84, 900	90, 800
Rock bass	1, 400	(1)	1, 400	3, 400	(1)	3, 400
Sauger				2, 218, 600	(1)	2, 218, 600
Sheepshead				3, 006, 800	(1)	3, 006, 800
Sturgeon	13, 300	3, 600	16, 900	6, 200	25, 000	31, 200
Sucker "mullet"	23, 100	(1)	23, 100	1, 524, 800	(1)	1, 524, 800
Sunfish	5, 600	(1)	5, 600			
White bass	800	(1)	800	394, 400	(1)	394, 400
Whitefish, common	40, 400	473, 600	514, 000	997, 200	710, 000	1, 707, 200
Yellow perch	34, 700	109, 200	143, 900	3, 434, 500	2, 729, 000	6, 163, 500
Yellow pike	7, 200	24, 500	31, 700	1, 180, 900	249, 400	1, 430, 300
Mussel shells				1, 066, 000	(1)	1, 066, 000
Miscellaneous		230, 200	230, 200		1, 421, 800	1, 421, 800
Total	526, 800	2, 584, 600	3, 111, 400	26, 186, 800	10, 231, 600	36, 418, 400

Species	Lake Huron			Lake Michigan	Lake Superior		
	United States	Canada	Total	United States	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bowfin	100	(1)	100				
Buffalofish				1, 400			
Burbot	2, 700	(1)	2, 700	55. 500	3, 600	(1)	3, 600
Carp	971, 900	20, 700	992, 600	918. 200	100	2, 400	2, 500
Catfish and bullheads	62, 000	3, 400	65, 400	46, 400			
Chubs	597, 700	997, 700	1, 595, 400	4, 035, 900	525, 200	673, 800	1, 199, 000
Lake herring	2, 409, 700	333, 400	2, 743, 100	4, 026. 500	6, 793. 700	1, 070. 000	7, 863, 700
Lake trout	1, 905, 400	3, 159, 000	5, 064, 400	5, 267, 800	2, 576, 300	968, 300	3, 544, 600
Pike or pickerel (jacks)	16, 400	151, 700	168, 100	39, 900	11, 900	12, 900	24, 800
Rock bass	13, 000	(1)	13, 000	1, 000			
Sauger	82, 400	(1)	82, 400	10, 200	300	(1)	300
Sheepshead	2, 700	(1)	2, 700	14, 400			
Smelt				909, 300			
Steelhead trout				3, 300			
Sturgeon		21, 900	21, 900			3, 600	3, 600
Sucker "mullet"	1, 924, 200	(1)	1, 924, 200	1, 739, 300	198, 400	(1)	198, 400
White bass				100			
Whitefish:							
Common	3, 237, 700	2, 042, 600	5, 280, 300	2, 468, 100	483, 100	245, 000	728, 100
Menominee	61, 100	(1)	61, 100	131, 200	27, 900	(1)	27, 900
Yellow perch	422, 700	125, 600	548, 300	1, 006, 100	6. 300	100	6, 400
Yellow pike	1, 640, 900	455, 500	2, 096, 400	169, 600	26, 500	87, 800	114, 300
Crawfish				30, 000			
Mussel shells				808, 200			
Miscellaneous		491, 100	491, 100			43, 800	43, 800
Total	13, 350, 600	7, 802, 600	21, 153, 200	21, 682, 400	10, 653, 300	3, 107, 700	13, 761, 000

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[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

Lake fisheries of the United States and Canada, 1933—Continued

CATCH: BY LAKES—Continued

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Burbot	16, 300	(1)	16, 300	24, 800	(1)	24, 800
Carp	----------	----------	----------	----------	300	300
Chubs	19, 800	(1)	19, 800	5, 000	2, 400	7, 400
Crappie	200	(1)	200	----------	----------	----------
Pike or pickerel	27, 300	3, 200	30, 500	40, 800	219, 200	260, 000
Sturgeon	----------	1, 800	1, 800	600	(1)	600
Sucker "mullet"	13, 200	(1)	13, 200	12, 100	(1)	12, 100
Tullibees	----------	----------	----------	13, 400	(1)	13, 400
Whitefish, common	9, 200	11, 700	20, 900	120, 700	17, 400	138, 100
Yellow perch	1, 900	(1)	1, 900	2, 600	7, 900	10, 500
Yellow pike	36, 200	10, 600	46, 800	61, 500	201, 100	262, 600
Miscellaneous	----------	----------	----------	----------	2, 900	2, 900
Total	124, 100	27, 300	151, 400	281, 500	451, 200	732, 700

Species	Lake of the Woods			Total, all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	----------	800	800	9, 013, 200	4, 214, 400	13, 227, 600
Bowfin	----------	----------	----------	1, 200	(1)	1, 200
Buffalofish	100	(1)	100	1, 500	(1)	1, 500
Burbot	64, 000	(1)	64, 000	419, 400	(1)	419, 400
Carp	10, 600	2, 700	13, 300	3, 974, 400	705, 100	4, 679, 500
Catfish and bullheads	32, 200	7, 300	39, 500	1, 206, 100	302, 700	1, 508, 800
Chubs	----------	----------	----------	5, 183, 600	1, 673, 900	6, 857, 500
Cisco	----------	----------	----------	135, 500	(1)	135, 500
Crappie	2, 400	(1)	2, 400	2, 600	177, 700	180, 300
Eels	----------	----------	----------	40, 200	65, 900	106, 100
Goldfish	----------	----------	----------	99, 500	(1)	99, 500
Lake herring	----------	----------	----------	13, 271, 600	2, 183, 700	15, 455, 300
Lake trout	200	25, 100	25, 300	9, 766, 600	4, 507, 100	14, 273, 700
Mooneye	100	(1)	100	5, 900	(1)	5, 900
Pike or pickerel	260, 200	433, 900	694, 100	405, 300	1, 097, 600	1, 502, 900
Rock bass	----------	----------	----------	18, 800	(1)	18, 800
Sauger	242, 500	2, 200	244, 700	2, 554, 000	2, 200	2, 556, 200
Sheepshead	----------	----------	----------	3, 023, 900	(1)	3, 023, 900
Smelt	----------	----------	----------	909, 300	(1)	909, 300
Steelhead trout	----------	----------	----------	3, 300	(1)	3, 300
Sturgeon	800	100	900	20, 900	56, 000	76, 900
Sucker "mullet"	168, 300	400	168, 700	5, 603, 400	400	5, 603, 800
Sunfish	----------	----------	----------	5, 600	(1)	5, 600
Tullibees	293, 300	27, 200	320, 500	306, 700	27, 200	333, 900
White bass	----------	----------	----------	395, 300	(1)	395, 300
Whitefish:						
Common	13, 300	411, 000	424, 300	7, 369, 700	3, 911, 300	11, 281, 000
Menominee	----------	----------	----------	220, 200	(1)	220, 200
Yellow perch	40, 000	8, 900	48, 900	4, 948, 800	2, 980, 700	7, 929, 500
Yellow pike	670, 600	773, 900	1, 444, 500	3, 793, 400	1, 802, 800	5, 596, 200
Crawfish	----------	----------	----------	30, 000	(1)	30, 000
Mussel shells	----------	----------	----------	1, 874, 200	(1)	1, 874, 200
Miscellaneous	----------	72, 600	72, 600	----------	2, 262, 400	2, 262, 400
Total	1, 798, 600	1, 766, 100	3, 564, 700	74, 604, 100	25, 971, 100	100, 575, 200

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[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

Lake fisheries of the United States, 1933

CATCH: By States

Species	New York		Pennsylvania		Ohio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	530, 800	$28, 810	1, 747, 400	$101, 150	6, 735, 000	$282, 869
Bowfin	700	28	----------	----------	----------	----------
Burbot	1, 000	62	1, 000	10	250, 000	5, 502
Carp	6, 300	150	4, 100	91	1, 283, 800	24, 390
Catfish and bullheads	69, 200	6, 430	9, 600	551	914, 200	51, 956
Cisco	9, 100	1, 170	104, 000	10, 360	22, 400	895
Eels	40, 200	1, 410	----------	----------	----------	----------
Goldfish	----------	----------	----------	----------	79, 700	599
Lake herring	41, 700	3, 700	----------	----------	----------	----------
Lake trout	16, 500	1, 725	400	39	----------	----------
Mooneye	----------	----------	----------	----------	5, 400	54
Pike or pickerel (jacks)	2, 900	885	----------	----------	----------	----------
Rock bass	1, 500	43	----------	----------	----------	----------
Sauger	----------	----------	----------	----------	2, 151, 800	83, 921
Sheepshead	----------	----------	17, 100	365	2, 851, 700	48, 478
Sturgeon	19, 000	5, 535	500	110	----------	----------
Sucker "mullet"	39, 500	1, 415	22, 600	455	1, 341, 200	20. 119
Sunfish	5, 600	154	----------	----------	----------	----------
White bass	2, 700	378	46, 800	1, 740	345, 700	11, 755
Whitefish, common	172, 300	31, 265	664, 300	92, 500	197, 100	25, 618
Yellow perch	80, 000	6, 890	277, 900	15, 290	3, 024, 500	111, 906
Yellow pike	13, 900	1, 530	19, 800	2, 130	1, 054, 800	72, 781
Mussel shells	----------	----------	----------	----------	1, 066, 000	13, 475
Pearls and slugs	----------	----------	----------	----------	----------	515
Total	1, 052, 900	91, 580	2, 915, 500	224, 791	21, 323, 300	754, 833

Species	Michigan		Indiana		Illinois	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	500	$5	----------	----------	----------	----------
Buffalofish	----------	----------	1, 400	$60	----------	----------
Burbot	15, 600	318	----------	----------	----------	----------
Carp	1, 782, 100	34, 914	3, 000	120	----------	----------
Catfish and bullheads	135, 900	6, 729	----------	----------	----------	----------
Chubs	1, 051, 900	90. 717	226, 000	18, 100	640. 000	$51, 200
Goldfish	19, 800	149	----------	----------	----------	----------
Lake herring	3, 618, 300	65, 623	78, 000	3, 120	72, 000	2, 200
Lake trout	6, 129, 200	661, 620	90, 000	8, 100	262, 000	23, 600
Mooneye	400	3	----------	----------	----------	----------
Pike or pickerel (jacks)	39, 300	3, 067	----------	----------	----------	----------
Rock bass	17, 300	1, 208	----------	----------	----------	----------
Sauger	159, 700	11, 977	----------	----------	----------	----------
Sheepshead	154, 800	2, 843	----------	----------	----------	----------
Smelt	9, 300	51	----------	----------	----------	----------
Steelhead trout	----------	----------	3, 300	460	----------	----------
Sucker "mullet"	3, 153, 700	62, 191	2, 000	80	----------	----------
White bass	100	4	----------	----------	----------	----------
Whitefish:						
Common	5, 775, 800	687, 929	4, 800	530	1, 800	210
Menominee	170, 800	13, 138	----------	----------	----------	----------
Yellow perch	730, 300	46, 234	25, 000	1, 500	66, 200	4, 000
Yellow pike	1, 910, 400	191, 294	4, 000	500	----------	----------
Mussel shells	----------	----------	150, 000	1, 900	----------	----------
Total	24, 875, 200	1, 880, 014	587, 500	34, 470	1, 042, 000	81, 210

Species	Wisconsin		Minnesota		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	----------	----------	----------	----------	9, 013, 200	$412, 829
Bowfin	----------	----------	----------	----------	1, 200	33
Buffalofish	----------	----------	100	$1	1, 500	61
Burbot	46, 700	$470	105, 100	388	419, 400	6, 750
Carp	884, 500	13, 300	10, 600	106	3, 974, 400	73, 071
Catfish and bullheads	45, 000	2, 700	32, 200	1, 935	1, 206, 100	70, 301
Chubs	3, 150, 000	252, 000	115, 700	9, 143	5, 183, 600	421, 160
Cisco	----------	----------	----------	----------	135, 500	12, 425
Crappie	----------	----------	2, 600	238	2, 600	238
Eels	----------	----------	----------	----------	40, 200	1, 410
Goldfish	----------	----------	----------	----------	99, 500	748
Lake herring	4, 259, 000	63, 850	5, 202, 600	78, 563	13, 271, 600	217, 056
Lake trout	3, 041, 000	298, 500	227, 500	24, 146	9, 766, 600	1, 017, 730
Mooneye	----------	----------	100	1	5, 900	58
Pike or pickerel (jacks)	34, 800	2, 720	328, 300	9, 644	405, 300	16, 316
Rock bass	----------	----------	----------	----------	18, 800	1, 251
Sauger	----------	----------	242, 500	9, 703	2, 554, 000	105, 601

Note.—Statistics of operating units were not obtained for 1933.

Lake fisheries of the United States, 1933—Continued

CATCH: BY STATES—Continued

Species	Wisconsin		Minnesota		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sheepshead	300	$9			3, 023, 900	$51, 695
Smelt	900, 000	18, 000			909, 300	18, 051
Steelhead trout					3, 300	460
Sturgeon			1, 400	$281	20, 900	5, 926
Sucker "mullet"	850, 600	23, 320	193, 800	2, 065	5, 603, 400	109, 645
Sunfish					5, 600	154
Tullibees			306, 700	846	306, 700	846
White bass					395, 300	13, 877
Whitefish:						
Common	404, 000	47, 100	149, 600	11, 174	7, 369, 700	896, 326
Menominee	45, 000	3, 300	4, 400	233	220, 200	16, 671
Yellow perch	700, 400	35, 025	44, 500	1, 822	4, 948, 800	222, 667
Yellow pike	22, 200	2, 120	768, 300	60, 487	3, 793, 400	330, 842
Crawfish	30, 000	2, 400			30, 000	2, 400
Mussel shells	658, 200	7, 900			1, 874, 200	23, 275
Pearls and slugs						515
Total	15, 071, 700	772, 714	7, 736, 000	210, 776	74, 604, 100	4, 050, 388

CATCH: BY LAKES

Species	Lake Ontario		Lake Erie			
	New York		New York		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	226, 800	$13, 460	304, 000	$15, 350	1, 747, 400	$101, 150
Bowfin	700	28				
Burbot	700	35	300	27	1, 000	10
Carp	6, 300	150			4, 100	91
Catfish and bullheads	68, 600	6, 370	600	60	9, 600	551
Cisco			9, 100	1, 170	104, 000	10, 360
Eels	40, 200	1, 410				
Lake herring	41, 700	3, 700				
Lake trout	12, 400	1, 325	4, 100	400	400	39
Pike or pickerel (jacks)	2, 900	885				
Rock bass	1, 400	42	100	1		
Sheepshead					17, 100	365
Sturgeon	13, 300	3, 805	5, 700	1, 730	500	110
Sucker "mullet"	23, 100	1, 200	16, 400	215	22, 600	455
Sunfish	5, 600	154				
White bass	800	48	1, 900	330	46, 800	1, 740
Whitefish, common	40, 400	4, 840	131, 900	26, 425	664, 300	92, 500
Yellow perch	34, 700	1, 830	45, 300	5, 060	277, 900	15, 290
Yellow pike	7, 200	730	6, 700	800	19, 800	2, 130
Total	526, 800	40, 012	526, 100	51, 568	2, 915, 500	224, 791

Species	Lake Erie					
	Ohio		Michigan		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	6, 735, 000	$282, 869			8, 786, 400	$399, 364
Bowfin			400	$4	400	9
Burbot	250, 000	5, 502	500	10	251, 800	5, 549
Carp	1, 283, 800	24, 390	779, 400	14, 810	2, 067, 300	39, 291
Catfish and bullheads	914, 200	51, 956	72, 500	3, 550	996, 900	56, 117
Cisco	22, 400	895			135, 500	12, 425
Goldfish	79, 700	599	19, 800	149	99, 500	748
Lake trout					4, 500	439
Mooneye	5, 400	54	400	3	5, 800	57
Pike or pickerel (jacks)			5, 900	134	5, 900	134
Rock bass			3, 300	102	3, 400	103
Sauger	2, 151, 800	83, 921	66, 800	2, 605	2, 218, 600	86, 526
Sheepshead	2, 851, 700	48, 478	138, 000	2, 347	3, 006, 800	51, 190
Sturgeon					6, 200	1, 840
Sucker "mullet"	1, 341, 200	20, 119	144, 600	2, 170	1, 524, 800	22, 959
White bass	345, 700	11, 755			394, 400	13, 825
Whitefish, common	197, 100	25, 618	3, 900	499	997, 200	145, 042
Yellow perch	3, 024, 500	111, 906	86, 800	3, 208	3, 434, 500	135, 464
Yellow pike	1, 054, 800	72, 781	99, 600	6, 870	1, 180, 900	82, 581
Mussel shells [1]	1, 066, 000	13, 475			1, 066, 000	13, 475
Pearls and slugs [1]		515				515
Total	21, 323, 300	754, 833	1, 421, 900	36, 461	26, 186, 800	1, 067, 653

[1] From tributary streams.

Lake fisheries of the United States, 1933—Continued

CATCH: BY LAKES—Continued

Species	Lake Huron		Lake Michigan			
	Michigan		Michigan		Indiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	100	$1				
Buffalofish					1,400	$60
Burbot	2,700	27	8,800	$245		
Carp	971,900	19,794	30,700	309	3,000	120
Catfish and bullheads	62,000	3,105	1,400	74		
Chubs	597,700	48,818	319,900	29,809	226,000	18,100
Lake herring	2,409,700	48,190	267,500	8,020	78,000	3,120
Lake trout	1,905,400	190,540	2,434,800	292,170	90,000	8,100
Pike or pickerel (jacks)	16,400	1,304	13,900	1,380		
Rock bass	13,000	1,044	1,000	62		
Sauger	82,400	8,230	10,200	1,112		
Sheepshead	2,700	81	14,100	415		
Smelt			9,300	51		
Steelhead trout					3,300	460
Sucker "mullet"	1,924,200	48,080	966,700	9,673	2,000	80
White bass			100	4		
Whitefish:						
Common	3,237,700	388,490	2,129,500	234,230	4,800	530
Menominee	61,100	3,490	93,200	8,656		
Yellow perch	422,700	29,660	214,900	12,900	25,000	1,500
Yellow pike	1,640,900	164,090	161,400	19,330	4,000	500
Mussel shells [1]					150,000	1,900
Total	13,350,600	954,944	6,677,400	618,440	587,500	34,470

Species	Lake Michigan					
	Illinois		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish					1,400	$60
Burbot			46,700	$470	55,500	715
Carp			884,500	13,300	918,200	13,729
Catfish and bullheads			45,000	2,700	46,400	2,774
Chubs	640,000	$51,200	2,850,000	228,000	4,035,900	327,109
Lake herring	72,000	2,200	3,609,000	54,100	4,026,500	67,440
Lake trout	262,000	23,600	2,481,000	248,100	5,267,800	571,970
Pike or pickerel (jacks)			26,000	2,100	39,900	3,480
Rock bass					1,000	62
Sauger					10,200	1,112
Sheepshead			300	9	14,400	424
Smelt			900,000	18,000	909,300	18,051
Steelhead trout					3,300	460
Sucker "mullet"			770,600	22,120	1,739,300	31,873
White bass					100	4
Whitefish:						
Common	1,800	210	332,000	39,900	2,468,100	274,870
Menominee			38,000	3,000	131,200	11,656
Yellow perch	66,200	4,000	700,000	35,000	1,006,100	53,400
Yellow pike			4,200	420	169,600	20,250
Crawfish			30,000	2,400	30,000	2,400
Mussel shells [1]			658,200	7,900	808,200	9,800
Total	1,042,000	81,210	13,375,500	677,519	21,682,400	1,411,639

Species	Lake Superior					
	Michigan		Wisconsin		Minnesota	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	3,600	$36				
Carp	100	1				
Chubs	134,300	12,090	300,000	$24,000	90,900	$9,087
Lake herring	941,100	9,413	650,000	9,750	5,202,600	78,563
Lake trout	1,789,000	178,910	560,000	50,400	227,300	24,129
Pike or pickerel (jacks)	3,100	249	8,800	620		
Sauger	300	30				
Sucker "mullet"	118,200	2,268	80,000	1,200	200	3
Whitefish:						
Common	404,700	64,710	72,000	7,200	6,400	733
Menominee	16,500	992	7,000	300	4,400	233
Yellow perch	5,900	466	400	25		
Yellow pike	8,500	1,004	18,000	1,700		
Total	3,425,300	270,169	1,696,200	95,195	5,531,800	112,748

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[1] From tributary streams.

Lake fisheries of the United States, 1933—Continued

CATCH: BY LAKES—Continued

Species	Lake Superior		Lake of the Woods, Rainy Lake, and Namakan Lake		Total, all lakes	
	Total		Minnesota			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					9, 013, 200	$412, 829
Bowfin					1, 200	33
Buffalofish			100	$1	1, 500	61
Burbot	3, 600	$36	105, 100	388	419, 400	6, 750
Carp	100	1	10, 600	106	3, 974, 400	73, 071
Catfish and bullheads			32, 200	1, 935	1, 206, 100	70, 301
Chubs	525, 200	45, 177	24, 800	56	5, 183, 600	421, 160
Cisco					135, 500	12, 425
Crappie			2, 600	238	2, 600	238
Eels					40, 200	1, 410
Goldfish					99, 500	748
Lake herring	6, 793, 700	97, 726			13, 271, 600	217, 056
Lake trout	2, 576, 300	253, 439	200	17	9, 766, 600	1, 017, 730
Mooneye			100	1	5, 900	58
Pike or pickerel (jacks)	11, 900	869	328, 300	9, 644	405, 300	16, 316
Rock bass					18, 800	1, 251
Sauger	300	30	242, 500	9, 703	2, 554, 000	105, 601
Sheepshead					3, 023, 900	51, 695
Smelt					909, 300	18, 051
Steelhead trout					3, 300	460
Sturgeon			1, 400	281	20, 900	5, 926
Sucker "mullet"	198, 400	3, 471	193, 600	2, 062	5, 603, 400	109, 645
Sunfish					5, 600	154
Tullibees			306, 700	846	306, 700	846
White bass					395, 300	13, 877
Whitefish:						
Common	483, 100	72, 643	143, 200	10, 441	7, 369, 700	896, 326
Menominee	27, 900	1, 525			220, 200	16, 671
Yellow perch	6, 300	491	44, 500	1, 822	4, 948, 800	222, 667
Yellow pike	26, 500	2, 704	768, 300	60, 487	3, 793, 400	330, 842
Crawfish					30, 000	2, 400
Mussel shells [1]					1, 874, 200	23, 275
Pearls and slugs [1]						515
Total	10, 653, 300	478, 112	2, 204, 200	98, 028	74, 604, 100	4, 050, 388

[1] From tributary streams.

FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES[13]

The most recent complete catch statistics of the fisheries for the States of the Mississippi River and tributaries are those collected for the year 1931. The yield of fishery products in that year amounted to 82,382,523 pounds, valued at $2,897,357, which was a decrease of 22 percent in quantity and 36 percent in value as compared with the quantity and value of the catch in 1922 when the most recent preceding survey was made. Detailed statistics of the fisheries of the Mississippi River and tributaries for 1931 appear in Fishery Industries of the United States, 1932 by R. H. Fiedler, appendix III to the Report of the Commissioner of Fisheries for the fiscal year 1933. A summary of these fisheries in 1931 as well as certain data for 1934 appear in the following tables.

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[13] For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of the document entitled "Statistical survey procedure."

Fisheries of the Mississippi River and tributaries, 1931

OPERATING UNITS: BY STATES

Item	Alabama	Arkansas	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Minnesota
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	104	1, 463	708	20	245	35	89	1, 402	160
Casual	131	1, 524	1, 318	1, 735	648	88	440	3, 108	578
Total	235	2, 987	2, 026	1, 755	893	123	529	4, 510	738
Boats:									
Motor	32	907	676	544	309	18	92	1, 225	65
Other	190	2, 359	957	1, 189	457	123	420	2, 369	446
Apparatus:									
Haul seines	--------	16	127	50	133	--------	24	377	113
Length, yards	--------	7, 308	33, 975	5, 170	36, 339	--------	2, 057	85, 166	49, 968
Anchor gill nets	--------	4	--------	--------	--------	--------	--------	74	9
Square yards	--------	2, 800	--------	--------	--------	--------	--------	17, 400	9, 999
Trammel nets	--------	31	28	3	--------	90	--------	78	--------
Square yards	--------	3, 899	4, 890	360	--------	9, 026	--------	19, 696	--------
Lines:									
Trot	449	5, 327	1, 312	320	1, 158	17	627	5, 757	186
Hooks	35, 980	455, 000	124, 715	16, 767	186, 250	360	37, 395	1, 392, 200	41, 800
Pound nets	--------	--------	--------	--------	2	--------	--------	--------	27
Fyke nets	610	5, 346	9, 852	335	1, 981	189	1, 231	5, 908	74
Dip nets	--------	--------	22	--------	10	--------	--------	159	--------
Traps:									
Crawfish	--------	--------	--------	--------	--------	--------	--------	18	--------
Shrimp	--------	--------	--------	--------	--------	--------	--------	88	--------
Baskets	--------	--------	3, 769	--------	--------	--------	--------	--------	--------
Mussel dredges	--------	426	14	--------	--------	--------	--------	--------	--------
Yards at mouth	--------	286	10	--------	--------	--------	--------	--------	--------
Crowfoot bars	168	1, 038	840	1, 092	464	--------	256	10	192
Tongs	--------	159	--------	72	--------	--------	--------	5	--------
Rakes	--------	70	--------	--------	--------	--------	--------	--------	--------
Forks	--------	102	33	1, 278	--------	29	--------	5	--------
Grabs	--------	--------	--------	--------	--------	--------	--------	2, 232	--------

Item	Mississippi	Missouri	Nebraska	Ohio	Oklahoma	South Dakota	Tennessee	Texas	Wisconsin	Total
Fishermen:										
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	211	177	--------	--------	5	--------	327	5	202	5, 153
Casual	198	170	299	49	19	67	206	41	112	10, 731
Total	409	347	299	49	24	67	533	46	314	15, 884
Boats:										
Motor	138	84	30	--------	--------	2	138	6	160	4, 426
Other	329	304	187	49	18	34	467	42	180	10, 120
Apparatus:										
Haul seines	16	47	12	2	2	11	--------	--------	83	1, 013
Length, yards	6, 885	5, 668	906	180	60	1, 948	--------	--------	20, 149	255, 779
Anchor gill nets	4	1	--------	--------	3	--------	--------	--------	6	101
Square yards	800	160	--------	--------	990	--------	--------	--------	13, 488	45, 637
Trammel nets	17	104	115	--------	--------	--------	52	--------	--------	518
Square yards	2, 867	14, 668	4, 833	--------	--------	--------	3, 560	--------	--------	63, 799
Lines:										
Hand	--------	--------	--------	--------	--------	--------	67	--------	--------	67
Hooks	--------	--------	--------	--------	--------	--------	67	--------	--------	67
Trot	847	516	--------	19	29	18	464	80	3	17, 129
Hooks	72, 155	34, 600	--------	900	1, 075	3, 600	41, 690	14, 500	125	2, 459, 112
Pound nets	--------	--------	--------	--------	--------	--------	--------	--------	345	374
Fyke nets	2, 591	1, 872	296	76	85	68	1, 735	70	222	32, 541
Dip nets	--------	--------	--------	--------	--------	--------	--------	--------	--------	191
Traps:										
Crawfish	--------	--------	--------	--------	--------	--------	--------	--------	--------	18
Shrimp	350	--------	--------	--------	--------	--------	--------	--------	--------	438
Baskets	--------	--------	--------	--------	--------	--------	--------	--------	--------	3, 769
Spears	--------	--------	--------	--------	--------	--------	12	--------	--------	12
Mussel dredges	--------	--------	--------	--------	--------	--------	--------	--------	--------	440
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	--------	--------	296
Crowfoot bars	--------	--------	--------	--------	--------	--------	230	--------	190	4, 480
Tongs	--------	9	--------	--------	--------	--------	--------	--------	--------	245
Rakes	--------	--------	--------	--------	--------	--------	--------	--------	--------	70
Forks	--------	--------	--------	--------	--------	--------	--------	--------	--------	1, 447
Grabs	--------	--------	--------	--------	--------	--------	--------	--------	--------	2, 232

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES

Species	Alabama		Arkansas		Illinois		Indiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Bowfin			700	$28	8, 308	$241		
Buffalofish	21, 330	$2, 342	2, 182, 446	131, 474	911, 609	51, 893	85, 045	$8, 156
Carp	11, 000	1, 118	808, 206	27, 268	4, 878, 744	128, 221	157, 641	10, 162
Catfish and bullheads	81, 200	8, 850	1, 077, 343	93, 150	647, 696	68, 890	35, 370	5, 302
Crappie	9, 772	1, 004	11, 325	227				
Eels					4, 985	322		
Mooneye					1, 000	20		
Paddlefish or spoonbill cat	3, 958	338	93, 200	2, 159	104, 846	5, 480	16, 492	1, 724
Quillback or "American carp"	7, 657	875	6, 830	676	17, 532	608	30, 312	1, 436
Sheepshead	45, 909	4, 972	676, 358	29, 877	177, 709	11, 321	38, 740	3, 711
Sturgeon, shovelnose	575	70			39, 766	3, 448	3, 013	292
Sucker "mullet"	5, 752	609	3, 309	235	25, 130	1, 087	16, 797	1, 156
White bass					1, 200	92		
Yellow pike							4, 550	693
Total	187, 153	20, 178	4, 859, 717	285, 094	6, 818, 525	271, 623	387, 960	32, 632
SHELLFISH, ETC.								
Mussel shells	1, 635, 000	10, 132	10, 872, 790	108, 819	7, 429, 528	82, 894	7, 328, 736	105, 632
Pearls				3, 137		190		125
Slugs		2, 444		14, 401		11, 835		18, 788
Turtles:								
Snapper					14, 577	696	500	25
Soft shell							400	20
Total	1, 635, 000	12, 576	10, 872, 790	126, 357	7, 444, 105	95, 615	7, 329, 636	124, 590
Grand total	1, 822, 153	32, 754	15, 732, 507	411, 451	14,262,630	367, 238	7, 717, 596	157, 222

Species	Iowa		Kansas		Kentucky		Louisiana [1]	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Bowfin	91, 825	$3, 759					5, 715	$114
Buffalofish	746, 615	59, 705	24, 325	$2, 222	164, 558	$14, 429	8, 784, 314	263, 261
Carp	1, 594, 244	80, 134	117, 489	10, 956	113, 461	8, 124	204, 743	4, 127
Catfish and bullheads	467, 340	48, 593	770	111	131, 777	17, 043	6, 602, 987	528, 579
Eels	325	15					200	6
Garfish							72, 450	791
Mooneye	1, 100	28			990	105		
Paddlefish or spoonbill cat	9, 400	638			18, 322	1, 617	495, 544	21, 508
Pike or pickerel	4, 700	470						
Quillback or "American carp"	60, 450	1, 339	100	11	11, 355	984	20, 700	431
Sauger					2, 365	451		
Sheepshead	343, 449	17, 619			52, 560	6, 762	1, 976, 600	39, 577
Sturgeon, shovelnose	17, 650	1, 663	175	24	2, 967	380		
Sucker "mullet"	36, 550	822			10, 294	1, 331		
Yellow pike					70	18		
Total	3, 373, 648	214, 785	142, 859	13, 324	508, 719	51, 244	18, 163, 253	858, 394
SHELLFISH, ETC.								
Crawfish							29, 248	292
Shrimp							38, 503	2, 423
Mussel shells	4, 366, 219	65, 685	312, 562	2, 713	1, 113, 032	8, 786	50, 000	375
Pearls		7, 244						
Slugs		13, 924		636		852		
Frogs							872, 651	130, 612
Terrapin	19, 100	377						
Turtles:								
Snapper	2, 000	40					58, 013	2, 244
Soft shell	17, 000	340					1, 700	34
Total	4, 404, 319	87, 610	312, 562	3, 349	1, 113, 032	9, 638	1, 050, 115	135, 980
Grand total	7, 777, 967	302, 395	455, 421	16, 673	1, 621, 751	60, 882	19, 213, 368	994, 374

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[1] According to information furnished by the Louisiana Department of Conservation, the Louisiana catch from fresh-water sources during 1934 was as follows: Buffalofish, 8,579,200 pounds, valued at $428,957; catfish or bullheads, 3,070,000 pounds, valued at $245,000; paddlefish or spoonbill cat, 373,900 pounds, valued at $26,175; sheepshead, 249,100 pounds, valued at $12,928; diamond-back terrapin, 563 dozen, valued at $7,756; and turtles, 822,300 pounds, valued at $103,114.

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Minnesota		Mississippi		Missouri		Nebraska	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Bowfin	16, 598	$282	--------	--------	17, 000	$520	--------	--------
Buffalofish	257, 431	15, 092	1, 511, 126	$63, 824	178, 991	16, 414	18, 104	$1, 813
Carp	2, 151, 119	97, 756	225, 276	6, 730	433, 117	33, 356	93, 032	9, 305
Catfish and bullheads	53, 804	4, 841	635, 049	42, 384	91, 430	15, 487	34, 174	5, 135
Eels	--------	--------	250	20	1, 055	53	--------	--------
Minnows	--------	--------	--------	--------	525	209	--------	--------
Paddlefish or spoonbill cat	--------	--------	158, 821	5, 879	40, 103	2, 917	--------	--------
Quillback or "American carp"	17, 246	519	2, 157	42	13, 672	946	--------	--------
Sheepshead	152, 545	7, 938	106, 844	2, 576	38, 186	3, 773	--------	--------
Sturgeon, shovelnose	1, 634	115	100	3	17, 282	1, 703	--------	--------
Sucker "mullet"	65, 273	1, 955	--------	--------	2, 275	292	--------	--------
Total	2, 715, 650	128, 498	2, 639, 623	121, 458	833, 636	75, 670	145, 310	16, 253
SHELLFISH, ETC.								
Shrimp	--------	--------	10, 000	1, 500	--------	--------	--------	--------
Mussel shells	782, 630	7, 827	--------	--------	94, 000	1, 193	--------	--------
Pearls	--------	157	--------	--------	--------	--------	--------	--------
Slugs	--------	1, 174	--------	--------	--------	118	--------	--------
Turtles, snapper	--------	--------	100	3	--------	--------	--------	--------
Total	782, 630	9, 158	10, 100	1, 503	94, 000	1, 311	--------	--------
Grand total	3, 498, 280	137, 656	2, 649, 723	122, 961	927, 636	76, 981	145, 310	16, 253

Species	Ohio		Oklahoma		South Dakota		Tennessee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Black bass	--------	--------	--------	--------	--------	--------	14, 000	$1, 680
Buffalofish	6, 433	$662	21, 605	$2, 142	38, 926	$3, 894	478, 592	34, 244
Carp	14, 370	1, 543	4, 268	425	52, 836	2, 642	247, 841	9, 597
Catfish and bullheads	4, 380	811	4, 935	695	13, 500	3, 528	271, 753	24, 750
Crappie	--------	--------	--------	--------	1, 392	70	18, 652	1, 658
Eels	--------	--------	--------	--------	--------	--------	163	25
Paddlefish or spoonbill cat	--------	--------	5, 332	533	400	40	5, 034	301
Quillback or "American carp"	1, 195	119	1, 950	195	4, 364	220	6, 065	843
Sheepshead	1, 318	224	1, 550	155	697	70	197, 670	10, 465
Sturgeon, shovelnose	558	72	--------	--------	--------	--------	3, 706	393
Sucker "mullet"	2, 902	268	--------	--------	2, 246	112	8, 323	1, 119
Sunfish	--------	--------	--------	--------	--------	--------	21, 850	1, 094
White bass	--------	--------	--------	--------	--------	--------	2, 100	106
Yellow pike	325	60	--------	--------	--------	--------	--------	--------
Total	31, 481	3, 759	39, 640	4, 145	114, 361	10, 576	1, 275, 749	86, 275
SHELLFISH, ETC.								
Mussel shells	154, 000	3, 005	--------	--------	--------	--------	2, 157, 000	15, 604
Pearls	--------	--------	--------	--------	--------	--------	--------	28
Slugs	--------	308	--------	--------	--------	--------	--------	1, 724
Frogs	--------	--------	--------	--------	--------	--------	2, 250	270
Terrapin	--------	--------	--------	--------	--------	--------	70	14
Total	154, 000	3, 313	--------	--------	--------	--------	2, 159, 320	17, 640
Grand total	185, 481	7, 072	39, 640	4, 145	114, 361	10, 756	3, 435, 069	103, 915

Species	Texas		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Black bass	--------	--------	--------	--------	14, 000	$1, 680
Bowfin	--------	--------	288, 170	$4, 355	428, 316	9, 299
Buffalofish	73, 000	$2, 190	268, 001	13, 528	15, 772, 451	687, 288
Carp	6, 900	138	777, 474	23, 800	11, 891, 761	455, 399
Catfish and bullheads	47, 800	3, 824	65, 539	5, 825	10, 266, 847	877, 798
Crappie	--------	--------	--------	--------	41, 141	2, 959
Eels	--------	--------	--------	--------	6, 978	441
Garfish	--------	--------	--------	--------	72, 450	791
Minnows	--------	--------	--------	--------	525	209
Mooneye	--------	--------	--------	--------	3, 090	153
Paddlefish or spoonbill cat	--------	--------	--------	--------	951, 452	43, 134
Pike or pickerel	--------	--------	--------	--------	4, 700	470
Quillback or "American carp"	500	10	66, 353	2, 032	268, 438	11, 286
Sauger	--------	--------	--------	--------	2, 365	451
Sheepshead	10, 300	206	84, 409	3, 692	3, 904, 844	142, 938
Sturgeon, shovelnose	--------	--------	--------	--------	87, 426	8, 163
Sucker "mullet"	--------	--------	135, 984	3, 696	314, 835	12, 682
Sunfish	--------	--------	--------	--------	21, 850	1, 094
White bass	--------	--------	--------	--------	3, 300	198
Yellow pike	--------	--------	--------	--------	4, 945	771
Total	138, 500	6, 368	1, 685, 930	56, 928	44, 061, 714	2, 257, 204

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Texas		Wisconsin		Total	
SHELLFISH, ETC.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crawfish					29, 248	$292
Shrimp					48, 503	3, 923
Mussel shells			959, 200	$8, 946	37, 254, 697	421, 611
Pearls				555		11, 436
Slugs				2, 012		68, 216
Frogs					874, 901	130, 882
Terrapin					19, 170	391
Turtles:						
Snapper					75, 190	3, 008
Soft shell					19, 100	394
Total			959, 200	11, 513	38, 320, 809	640, 153
Grand total	138, 500	$6, 368	2, 645, 130	68, 441	82, 382, 523	2, 897, 357

Industries related to the fisheries of the Mississippi River and tributaries

OPERATING UNITS, SALARIES, AND WAGES, 1931

Item	Arkansas	Illinois	Indiana	Iowa	Kentucky	Louisiana	Minnesota and North Dakota
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged	13				11	5	
Vessels, motor	4				2	2	
Net tonnage	69				15	20	
Wholesale and manufacturing:							
Establishments	6	38	4	61	11	22	13
Persons engaged:							
Proprietors	3	42	1	52	8	24	11
Salaried employees	9	3	5	79	20	14	27
Wage earners:							
Average for season	152	331	140	2, 500	261	70	112
Average for year	72	235	93	2, 179	159	68	112
Paid to salaried employees	$11, 417	$9, 520	$6, 820	$141, 346	$33, 159	$12, 400	$55, 200
Paid to wage earners	$53, 503	$145, 683	$51, 444	$1, 417, 678	$81, 643	$37, 700	$81, 500
Total salaries and wages	$64, 920	$155, 203	$58, 264	$1, 559, 024	$114, 802	$50, 100	$136, 700
Fishermen manufacturing		4	2			200	

Item	Mississippi	Missouri and Oklahoma	Nebraska and Kansas	Ohio and Pennsylvania	Tennessee	Wisconsin	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged							29
Vessels, motor							8
Net tonnage							104
Wholesale and manufacturing:							
Establishments	6	21	3	13	11	8	217
Persons engaged:							
Proprietors	7	24	3	17	9	3	204
Salaried employees	3	125	8	37	15	10	355
Wage earners:							
Average for season	26	328	52	175	90	38	4, 275
Average for year	26	261	52	145	52	29	3, 483
Paid to salaried employees	$16, 000	$291, 874	$17, 400	$95, 878	$34, 884	$12, 998	$738, 896
Paid to wage earners	$22, 382	$202, 944	$45, 580	$138, 817	$38, 177	$24, 483	$2, 341, 534
Total salaries and wages	$38, 382	$494, 818	$62, 980	$234, 695	$73, 061	$37, 481	$3, 080, 430
Fishermen manufacturing	7	3					216

Industries related to the fisheries of the Mississippi River and tributaries—Continued

PRODUCTS MANUFACTURED

Item	Indiana		Iowa		Kansas, Kentucky, Illinois, and Missouri	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:						
Salmon, smoked............pounds..			240,000	$48,800		
Sturgeon, smoked............do....			162,000	39,140		
Mussel-shell products:						
Buttons [2]............gross..			11,422,475	2,849,520	(1)	(1)
Poultry feed [2]............tons..	(3)	(3)	6,340	37,514	(1)	(1)
Lime [2]............do....			1,600	3,925	(1)	(1)
Unclassified [2]............				[4] 102,396		[5] $78,896
Unclassified, smoked............pounds..			[6] 83,000	[6] 14,440		
Total............				3,095,735		78,896
By fishermen:						
Carp, smoked............pounds..					667	67
Paddlefish roe, salted............do....	450	$180			900	540
Sheepshead, smoked............do....					617	77
Sturgeon:						
Smoked............do....					1,333	400
Roe, salted............do....					35	32
Total............	450	180			3,552	1,116
Grand total............	450	180		3,095,735	3,552	80,012

Item	Louisiana		Minnesota and Nebraska		Mississippi		Tennessee, Ohio, and Pennsylvania	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Salmon, smoked.....pounds..			(1)	(1)			(1)	(1)
Sturgeon, smoked......do....			(1)	(1)				
Whitefish, smoked......do....			255,000	$47,200				
Unclassified, smoked...do....			[7] 66,600	[7] 19,793			[8] 291,500	[8] $77,205
Total............			321,600	66,993			[8] 291,500	[8] 77,205
By fishermen:								
Alligator hides.......pounds..	88,356	$7,363						
Paddlefish roe, salted...do....					245	$92		
Total............	88,356	7,363			245	92		
Grand total............	88,356	7,363	321,600	66,993	245	92	291,500	77,205

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[1] The production of this item is included under unclassified products.

[2] Data are for 1934.

[3] A small production of poultry feed has been included with the unclassified mussel-shell products of Kansas, Kentucky, Illinois, and Missouri.

[4] Includes the production of mussel-shell stucco, novelties, and colored shell chips.

[5] Includes the production of mussel-shell buttons, poultry feed, and lime.

[6] Includes the production of smoked buffalofish and tullibees.

[7] Includes the production of smoked eels, salmon, and sturgeon.

[8] Includes the production of smoked buffalofish, butterfish, carp, chubs, lake trout, paddlefish, sablefish, salmon, and tullibees.

NOTE.—Unless otherwise indicated the data are for 1931. The total value of the manufactured products for the States of the Mississippi River and tributaries was as follows: By manufacturing establishments, $3,318,829, and by fishermen, $8,751. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State.

LAKE PEPIN

Fisheries of Lake Pepin, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trot lines	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
Regular	12	8	----------	6	14
Casual	44	22	8	9	54
Total	56	30	8	15	68
Boats:					
Motor	16	20	6	15	35
Other	16	12	2	7	31
Apparatus:					
Number	16	38	8	130	----------
Length, yards	3, 720	----------	----------	----------	----------
Square yards	----------	26, 000	----------	----------	----------
Hooks	----------	----------	800	----------	----------

CATCH: BY GEAR

Species	Haul seines		Anchor gill nets		Trot lines		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3, 000	$60	--------	--------	--------	--------	--------	--------	3, 000	$60
Buffalofish	9, 000	270	2, 500	$75	--------	--------	3, 800	$114	15, 300	459
Carp	221, 000	4, 420	100, 000	2, 000	800	$16	47, 500	950	369, 300	7, 386
Catfish and bullheads	2, 600	260	4, 300	430	4, 000	400	11, 200	1, 120	22, 100	2, 210
Eels	--------	--------	--------	--------	--------	--------	100	10	100	10
Mooneye	4, 000	80	--------	--------	--------	--------	--------	--------	4, 000	80
Sheepshead	5, 900	285	900	45	1, 000	40	1, 200	56	9, 000	426
Sucker "mullet"	9, 000	160	2, 500	50	--------	--------	1, 000	20	12, 500	230
Turtles:										
Snapper	500	10	--------	--------	--------	--------	--------	--------	500	10
Soft shell	500	10	--------	--------	--------	--------	--------	--------	500	10
Total	255, 500	5, 555	110, 200	2, 600	5, 800	456	64, 800	2, 270	436, 300	10, 881

OPERATING UNITS: BY STATES

Item	Minnesota	Wisconsin	Total for lake
	Number	*Number*	*Number*
Fishermen:			
Regular	----------	14	14
Casual	10	44	54
Total	10	58	68
Boats:			
Motor	7	28	35
Other	4	27	31
Apparatus:			
Haul seines	2	14	16
Length, yards	400	3, 320	3, 720
Gill nets, anchor	----------	38	38
Square yards	----------	26, 000	26, 000
Lines, trot	8	----------	8
Hooks	800	----------	800
Fyke nets	----------	130	130

Fisheries of Lake Pepin, 1934—Continued

CATCH: BY STATES

Species	Minnesota		Wisconsin		Total for lake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			3,000	$60	3,000	$60
Buffalofish	1,500	$45	13,800	414	15,300	459
Carp	14,800	296	354,500	7,090	369,300	7,386
Catfish and bullheads	4,400	440	17,700	1,770	22,100	2,210
Eels			100	10	100	10
Mooneye			4,000	80	4,000	80
Sheepshead	3,500	155	5,500	271	9,000	426
Sucker "mullet"	500	10	12,000	220	12,500	230
Turtles:						
Snapper	300	6	200	4	500	10
Soft shell	300	6	200	4	500	10
Total	25,300	958	411,000	9,923	436,300	10,881

LAKE KEOKUK

Fisheries of Lake Keokuk, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
Regular	12				10	14
Casual	77	6	6	51	59	97
Total	89	6	6	51	69	111
Boats:						
Motor	23	6	6	30	44	60
Other	25			23	34	54
Apparatus:						
Number	29	6	6	93	1,340	
Length, yards	8,000					
Square yards		1,000	300			
Hooks				11,600		

CATCH: BY GEAR

Species	Haul seines		Gill nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	1,000	$20				
Buffalofish	51,300	1,569	1,000	$30		
Carp	263,000	5,260	10,000	200	14,000	$280
Catfish and bullheads	10,300	1,030	500	50	12,800	1,280
Paddlefish or spoonbill cat	14,400	1,340				
Pike or pickerel	1,500	75				
Sheepshead	78,900	3,945	3,000	150	10,000	525
Sucker "mullet"	3,000	60				
Turtles:						
Snapper	4,200	84			1,000	21
Soft shell	1,050	21				
Total	428,650	13,404	14,500	430	37,800	2,106

Fisheries of Lake Keokuk, 1934—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Trammel nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	--------	--------	--------	--------	1,000	$20
Buffalofish	30,300	$949	2,000	$60	84,600	2,608
Carp	60,500	1,210	5,000	100	352,500	7,050
Catfish and bullheads	82,900	8,290	2,000	200	108,500	10,850
Paddlefish or spoonbill cat	--------	--------	--------	--------	14,400	1,340
Pike or pickerel	500	25	--------	--------	2,000	100
Sheepshead	36,600	1,830	5,000	250	133,500	6,700
Sucker "mullet"	2,400	48	500	10	5,900	118
Turtles:						
Snapper	300	6	--------	--------	5,500	111
Soft shell	100	2	--------	--------	1,150	23
Total	213,600	12,360	14,500	620	709,050	28,920

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Total for lake
Fishermen:	*Number*	*Number*	*Number*
Regular	4	10	14
Casual	49	48	97
Total	53	58	111
Boats:			
Motor	32	28	60
Other	30	24	54
Apparatus:			
Haul seines	13	16	29
Length, yards	3,000	5,000	8,000
Gill nets, anchor	--------	6	6
Square yards	--------	1,000	1,000
Trammel nets	--------	6	6
Square yards	--------	300	300
Lines, trot	48	45	93
Hooks	5,600	6,000	11,600
Fyke nets	770	570	1,340

CATCH: BY STATES

Species	Illinois		Iowa		Total for lake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	--------	--------	1,000	$20	1,000	$20
Buffalofish	19,100	$643	65,500	1,965	84,600	2,608
Carp	112,000	2,240	240,500	4,810	352,500	7,050
Catfish and bullheads	70,500	7,050	38,000	3,800	108,500	10,850
Paddlefish or spoonbill cat	10,000	900	4,400	440	14,400	1,340
Pike or pickerel	--------	--------	2,000	100	2,000	100
Sheepshead	35,500	1,800	98,000	4,900	133,500	6,700
Sucker "mullet"	400	8	5,500	110	5,900	118
Turtles:						
Snapper	1,700	34	3,800	77	5,500	111
Soft shell	400	8	750	15	1,150	23
Total	249,600	12,683	459,450	16,237	709,050	28,920

FISHERIES OF THE MISSISSIPPI RIVER BETWEEN LAKE PEPIN AND LAKE KEOKUK

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1934

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot-lines	Pound nets	Fyke nets	Dip nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	101	--------	10	--------	--------	145	--------	164
Casual	301	9	70	254	4	354	11	548
Total	402	9	80	254	4	499	11	712
Boats:								
Motor	154	6	78	172	2	366	--------	434
Other	154	3	7	83	2	130	--------	292
Apparatus:								
Number	163	7	80	411	10	13, 215	11	--------
Length, yards	42, 450	--------	--------	--------	--------	--------	--------	--------
Square yards	--------	2, 600	5, 900	--------	--------	--------	--------	--------
Hooks	--------	--------	--------	66, 175	--------	--------	--------	--------

CATCH: BY GEAR

Species	Haul seines		Anchor gill nets		Trammel nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	83, 950	$1, 689	--------	--------	--------	--------	--------	--------
Buffalofish	283, 300	8, 499	6, 500	$195	45, 600	$1, 368	--------	--------
Carp	1, 329, 000	26, 580	15, 500	310	57, 000	1, 100	56, 900	$1, 138
Catfish and bullheads	49, 000	4, 900	950	95	10, 200	1, 020	89, 600	8, 960
Eels	300	25	--------	--------	--------	--------	200	10
Mooneye	31, 100	622	--------	--------	--------	--------	--------	--------
Paddlefish or spoonbill cat	8, 000	800	--------	--------	600	60	--------	--------
Pike or pickerel	8, 500	485	--------	--------	--------	--------	--------	--------
Sheepshead	313, 300	15, 650	4, 300	215	23, 600	1, 177	33, 700	1, 681
Sturgeon, shovelnose	9, 450	945	750	75	34, 700	3, 470	--------	--------
Sucker "mullet"	93, 150	1, 863	2, 100	42	5, 900	128	--------	--------
Turtles:								
Snapper	25, 900	524	--------	--------	--------	--------	500	10
Soft shell	12, 400	248	--------	--------	--------	--------	--------	--------
Total	2, 247, 350	62, 830	30, 100	932	177, 600	8, 323	180, 900	11, 799

Species	Pound nets		Fyke nets		Dip nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	--------	--------	600	$12	--------	--------	84, 550	$1, 701
Buffalofish	3, 000	$90	377, 100	11, 348	5, 500	$165	721, 000	21, 665
Carp	44, 000	880	647, 000	12, 850	5, 000	100	2, 154, 400	42, 958
Catfish and bullheads	1, 000	100	446, 150	44, 615	100	10	597, 000	59, 700
Eels	--------	--------	950	85	--------	--------	1, 450	120
Mooneye	--------	--------	5, 000	100	--------	--------	36, 100	722
Paddlefish or spoonbill cat	--------	--------	--------	--------	--------	--------	8, 600	860
Pike or pickerel	--------	--------	--------	--------	--------	--------	8, 500	485
Sheepshead	3, 000	150	231, 300	11, 548	3, 500	175	612, 700	30, 596
Sturgeon, shovelnose	--------	--------	300	30	--------	--------	45, 200	4, 520
Sucker "mullet"	2, 000	40	47, 100	942	100	2	150, 350	3, 017
Turtles:								
Snapper	--------	--------	200	4	--------	--------	26, 600	538
Soft shell	--------	--------	--------	--------	--------	--------	12, 400	248
Total	53, 000	1, 260	1, 755, 700	81, 534	14, 200	452	4, 458, 850	167, 130

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1934—Continued

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Minnesota	Wisconsin	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	30	92	2	40	164
Casual	157	218	59	114	548
Total	187	310	61	154	712
Boats:					
Motor	116	203	25	90	434
Other	86	120	41	45	292
Apparatus:					
Haul seines	42	66	15	40	163
Length, yards	9, 750	17, 900	3, 100	11, 700	42, 450
Gill nets, anchor	----------	----------	3	4	7
Square yards	----------	----------	500	2, 100	2, 600
Trammel nets	4	74	----------	2	80
Square yards	400	5, 300	----------	200	5, 900
Lines, trot	150	176	41	44	411
Hooks	25, 700	31, 400	4, 900	4, 175	66, 175
Pound nets	----------	10	----------	----------	10
Fyke nets	3, 940	6, 840	120	2, 315	13, 215
Dip nets	----------	11	----------	----------	11

CATCH: BY STATES

Species	Illinois		Iowa		Minnesota		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3, 300	$66	36, 350	$727	4, 900	$108	40, 000	$800	84, 550	$1, 701
Buffalofish	183, 300	5, 499	342, 700	10, 281	33, 000	990	162, 000	4, 895	721, 000	21, 665
Carp	396, 800	7, 936	963, 300	19, 226	132, 500	2, 560	661, 800	13, 236	2, 154, 400	42, 958
Catfish and bullheads	162, 600	16, 260	311, 900	31, 190	27, 750	2, 775	94, 750	9, 475	597, 000	59, 700
Eels	600	50	450	40	200	10	200	20	1, 450	120
Mooneye	--------	-------	5, 200	104	2, 600	52	28, 300	566	36, 100	722
Paddlefish or spoonbill cat	2, 100	210	5, 500	550	--------	------	1, 000	100	8, 600	860
Pike or pickerel	8, 500	485	--------	-------	--------	------	--------	-------	8, 500	485
Sheepshead	199, 700	9, 985	254, 400	12, 694	29, 000	1, 446	129, 600	6, 471	612, 700	30, 596
Sturgeon, shovelnose	7, 000	700	35, 950	3, 595	--------	------	2, 250	225	45, 200	4, 520
Sucker "mullet"	22, 000	440	60, 600	1, 222	13, 900	278	53, 850	1, 077	150, 350	3, 017
Turtles:										
Snapper	4, 400	88	8, 600	178	2, 400	48	11, 200	224	26, 600	538
Soft shell	2, 750	55	4, 350	87	1, 000	20	4, 300	86	12, 400	248
Total	993, 050	41, 774	2,029 300	79, 894	247, 250	8, 287	1, 189, 250	37, 175	4, 458, 850	167, 130

FISHERIES OF ALASKA [14]

The commercial catch of fishery products in Alaska during 1934, exclusive of whales, amounted to 809,914,821 pounds, valued at $11,706,935, which is an increase of 29 percent both in volume and value as compared with the catch in 1933. Of the total catch in 1934, 624,651,388 pounds, valued at $9,881,113, consisted of salmon; 182,531,160 pounds, valued at $1,660,234, other fish; and 2,732,273 pounds, valued at $165,588, shellfish. In addition, 465 whales were taken. These fisheries gave employment to 9,433 fishermen, 1,758 persons on transporting craft, and 14,999 persons in fisheries wholesale and manufacturing industries—a total of 26,190 persons, which is an increase of 21 percent as compared with the number employed in 1933.

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[14] Statistics for the fisheries of Alaska are collected and compiled by the Alaska Division of this Bureau. A summary of these statistics appear in this section. For detailed figures the reader is referred to Alaska Fishery and Fur-Seal Industries in 1934, by Ward T. Bower, Appendix I to the Report of the Commissioner of Fisheries for the fiscal year 1935.

Fisheries of Alaska, 1934

SUMMARY: BY DISTRICTS

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	*Value*	*Number*	*Value*	*Number*	*Value*	*Number*	*Value*
PERSONS ENGAGED								
In fishing	4, 190		2, 206		3, 037		9, 433	
In transporting	704		669		385		1, 758	
In wholesale and manufacturing industries	6, 632		4, 274		4, 093		14, 999	
Total	11, 526		7, 149		7, 515		26, 190	
CRAFT EMPLOYED								
Vessels fishing	566		60		10		636	
Boats fishing	1, 745		1, 210		1, 320		4, 275	
Vessels transporting	167		133		78		378	
Scows, houseboats, pile drivers, etc	273		251		184		708	
Total	2, 751		1, 654		1, 592		5, 997	
CATCH								
Fish:	*Pounds*		*Pounds*		*Pounds*		*Pounds*	
Salmon	267, 661, 090	$3, 816, 263	184, 875, 472	$2, 927, 888	172, 114, 826	$3, 136, 962	624, 651, 388	$9, 881, 113
Other	128, 783, 475	1, 390, 332	48, 925, 923	245, 773	4, 821, 762	24, 129	182, 531, 160	1, 660, 234
Shellfish	1, 249, 670	70, 672	1, 482, 603	94, 916			2, 732, 273	165, 588
Total	397, 694, 235	5, 277, 267	235, 283, 998	3, 268, 577	176, 936, 588	3, 161, 091	809, 914, 821	11, 706, 935
	Number		*Number*		*Number*		*Number*	
Whales			237		228		465	
WHOLESALE AND MANUFACTURING								
Establishments	95		91		45		231	
PRODUCTS AS PREPARED FOR MARKET	*Pounds*		*Pounds*		*Pounds*		*Pounds*	
Salmon	168, 971, 402	14, 965, 741	112, 471, 299	11, 481, 916	91, 142, 786	12, 301, 818	372, 585, 487	38, 749, 475
Herring	46, 864, 093	925, 737	20, 719, 675	550, 037	2, 822, 450	127, 250	70, 406, 218	1, 603, 024
Halibut	13, 221, 338	804, 785					13, 221, 338	804, 785
Cod			309, 360	12, 767	183, 545	7, 139	492, 905	19, 906
Trout	66, 113	4, 987	1, 500	30			67, 613	5, 017
Sablefish	215, 344	9, 499					215, 344	9, 499
Flounder	270, 000	4, 000					270, 000	4, 000
Rockfish	4, 294	142					4, 294	142
Clam	852	144	390, 342	188, 522			391, 194	188, 666
Shrimp	379, 248	119, 423	2, 208	688			381, 456	120, 111

Crab	288, 316	93, 516	354, 832	114, 147	----	----	643, 148	207, 663
Whale	----	----	4, 246, 375	109, 246	5, 107, 500	141, 759	9, 353, 875	251, 005
Total	230, 281, 000	16, 927, 974	138, 495, 591	12, 457, 353	99, 256, 281	12, 577, 966	468, 032, 872	41, 963, 293

OPERATING UNITS: BY DISTRICTS

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Fishermen	4, 190	2, 206	3, 037	9, 433
Vessels fishing:				
Steam	----	3	4	7
Net tonnage	----	201	340	541
Motor	566	57	6	629
Net tonnage	7, 236	1, 386	192	8, 814
Boats fishing:				
Motor	721	256	45	1, 022
Other	1, 024	954	1, 275	3, 253
Apparatus:				
Traps	290	169	----	459
Purse seines	388	159	6	553
Yards	129, 714	39, 440	3, 360	172, 514
Haul seines	4	136	----	140
Yards	800	26, 556	----	27, 356
Gill nets	304	985	2, 420	3, 709
Yards	42, 030	105, 730	324, 792	472, 552

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
Apparatus—Continued	*Number*	*Number*	*Number*	*Number*
Beam trawls	12	----	----	13
Wheels	----		262	262
Lines:		34		
Hand lines (cod fishery)	----	4	35	69
Trawl lines (cod fishery)	----	----	1	5
Troll lines (salmon fishery)	3, 207	----	----	3, 207
Skates of lines (halibut fishery)	2, 498	1, 191	----	2, 498
Crab pots	1, 660	11	----	2, 851
Herring pounds	9	2	----	20
Herring pound seines	9		----	11
		1		

CATCH: BY DISTRICTS

[Estimated round weight and value to the fishermen]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Blueback, red or sockeye	8, 693, 181	$200, 127	57, 913, 163	$1, 252, 703	158, 850, 377	$3, 057, 017	225, 456, 721	$4, 509, 847
Chinook or king	6, 780, 640	191, 500	2, 151, 200	49, 271	2, 261, 300	29, 421	11, 193, 140	270, 192
Chum or keta	34, 249, 590	368, 755	28, 150, 713	290, 570	10, 736, 181	46, 852	73, 136, 484	706, 177
Humpback or pink	201, 311, 560	2, 765, 636	90, 675, 972	1, 234, 177	165, 720	2, 073	292, 153, 252	4, 001, 886
Silver or coho	16, 626, 119	290, 245	5, 984, 424	101, 167	101, 248	1, 599	22, 711, 791	393, 011
Herring	113, 383, 883	566, 919	48, 040, 770	240, 204	4, 212, 612	21, 063	165, 637, 265	828, 186
Halibut	14, 690, 375	804, 785					14, 690, 375	804, 785
Cod	----	----	877, 653	5, 539	609, 150	3, 066	1, 486, 803	8, 605

Fisheries of Alaska, 1934—Continued

CATCH: BY DISTRICTS—Continued

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued								
Trout:								
Dolly Varden	33, 272	$2, 526	7, 500	$30			40, 772	$2, 556
Steelhead	52, 657	2, 461					52, 657	2, 461
Sablefish	316, 682	9, 499					316, 682	9, 499
Flounders	300, 000	4, 000					300, 000	4, 000
Rockfishes	6, 606	142					6, 606	142
Total	396, 444, 565	5, 206, 595	233, 801, 395	3, 173, 661	176, 936, 588	$3, 161, 091	807, 182, 548	11, 541, 347
SHELLFISH								
Crabs	561, 517	46, 758	697, 904	57, 074			1, 259, 421	103, 832
Shrimp	686, 449	23, 885	4, 015	138			690, 464	24, 023
Clams:								
Butter	1, 704	29					1, 704	29
Razor			780, 684	37, 704			780, 684	37, 704
Total	1, 249, 670	70, 672	1, 482, 603	94, 916			2, 732, 273	165, 588
Grand total	397, 694, 235	5, 277, 267	235, 283, 998	3, 268, 577	176, 936, 588	3, 161, 091	809, 914, 821	11, 706, 935

NOTE.—In addition to the above, 465 whales were taken in Alaska waters. The round weight and value to the fishermen cannot be determined, but the products amounted to 9,353,875 pounds, valued at $251,005.

Industries related to the fisheries of Alaska, 1934

TRANSPORTING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Persons engaged	704	669	385	1, 758
Vessels transporting:				
Steam			11	11
Net tonnage			19, 967	19, 967
Vessels transporting—Continued.				
Motor	167	133	67	367
Net tonnage	4, 974	4, 644	4, 442	14, 060
Scows, houseboats, pile drivers, etc	273	251	184	708

WHOLESALE AND MANUFACTURING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Persons engaged	6,632	4,274	4,093	14,999
Establishments:				
Handling fresh and frozen fish	44	4		48
Curing fish	36	39	26	101
Canning fish	51	51	23	125
Manufacturing byproducts	9	5	1	15
Total (exclusive of duplication)	95	91	45	231

PRODUCTS AS PREPARED FOR MARKET

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FRESH								
Salmon (for food)	1,385,789	$69,837					1,385,789	$69,837
Salmon (for bait and fox feed)	24,600	150	2,000	$10			26,600	160
Herring (for bait)	2,117,160	21,201	1,241,625	10,663			3,358,785	31,864
Halibut	7,253,775	444,525					7,253,775	444,525
Trout	23,372	1,441					23,372	1,441
Sablefish	9,075	349					9,075	349
Flounders	270,000	4,000					270,000	4,000
Rockfishes	1,100	30					1,100	30
Crabs:								
Meat	68,082	21,254	3,880	1,164			71,962	22,418
Whole in shell	15,115	696	11,760	497			26,875	1,193
Shrimp:								
Meat	375,015	118,619	2,208	688			377,223	119,307
Whole in shell	3,780	525					3,780	525
Total	11,546,863	682,627	1,261,473	13,022			12,808,336	695,649
FROZEN								
Salmon (for food)	5,316,574	334,812					5,316,574	334,812
Salmon (for bait)	99,700	450					99,700	450
Herring (for bait)	3,009,765	20,229					3,009,765	20,229
Halibut	5,967,563	360,260					5,967,563	360,260
Trout	31,341	2,443					31,341	2,443
Sablefish	206,069	9,138					206,069	9,138
Rockfishes	3,194	112					3,194	112
Total	14,634,206	727,444					14,634,206	727,444

Fisheries of Alaska, 1934—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
CURED								
Salmon:								
Mild cured	3, 162, 400	$559, 329	12, 800	$1, 298	357, 600	$55, 484	3, 532, 800	$616, 111
Pickled			254, 400	17, 432	133, 050	11, 555	387, 450	28, 987
Dried, kippered, and dry salted			35, 450	1, 794	1, 404, 200	56, 300	1, 439, 650	58, 094
Herring:								
Pickled (for bait)			23, 400	166			23, 400	166
Pickled (for food):								
Scotch cure	2, 137, 075	119, 791	3, 251, 875	225, 323	2, 020, 250	100, 362	7, 409, 200	445, 476
Norwegian cure	21, 790	965			208, 750	7, 333	230, 540	8, 298
Roused					513, 050	16, 854	513, 050	16, 854
Spiced	2, 600	390	40, 400	770			43, 000	1, 160
Dry salted					80, 400	2, 701	80, 400	2, 701
Cod:								
Dry salted			170, 800	6, 119	181, 545	7, 039	352, 345	13, 158
Pickled			115, 160	4, 245	2, 000	100	117, 160	4, 345
Stock fish			23, 400	2, 403			23, 400	2, 403
Trout, dried			1, 500	30			1, 500	30
Sablefish, pickled	200	12					200	12
Total	5, 324, 065	680, 487	3, 929, 185	259, 580	4, 900, 845	257, 728	14, 154, 095	1, 197, 795
CANNED								
Salmon:								
Blueback, red or sockeye	5, 011, 104	772, 186	34, 054, 560	4, 896, 176	87, 079, 104	11, 980, 292	126, 144, 768	17, 648, 654
Chinook or king	748, 512	114, 433	1, 366, 656	191, 207	422, 256	56, 259	2, 537, 424	361, 899
Chum or keta	18, 922, 176	1, 435, 921	15, 035, 184	1, 138, 541	1, 593, 408	127, 383	35, 550, 768	2, 701, 845
Humpback or pink	125, 873, 376	10, 823, 571	57, 593, 856	4, 834, 099	94, 032	8, 132	183, 561, 264	15, 665, 802
Silver or coho	7, 609, 296	834, 932	3, 665, 808	392, 545	58, 512	6, 273	11, 333, 616	1, 233, 750
Miscellaneous fish	11, 400	1, 103			624	140	12, 024	1, 243
Clams	852	144	390, 342	188, 522			391, 194	188, 666
Crabs	205, 119	71, 566	339, 192	112, 486			544, 311	184, 052
Shrimp	453	279					453	279
Total	158, 382, 288	14, 054, 135	112, 445, 598	11, 753, 576	89, 247, 936	12, 178, 479	360, 075, 822	37, 986, 190
BYPRODUCTS								
Fertilizer:								
Salmon	702, 000	10, 530	313, 560	4, 703			1, 015, 560	15, 233
Whale			1, 330, 000	18, 389	1, 368, 000	19, 116	2, 698, 000	37, 505
Meal, herring	19, 956, 468	316, 604	7, 954, 000	125, 613			27, 910, 468	442, 217

Oil:								
Salmon	115, 875	9, 590	137, 025	4, 111			252, 900	13, 701
Herring	19, 619, 235	446, 557	8, 208, 375	187, 502			27, 827, 610	634, 059
Whale			2, 844, 375	88, 745	3, 237, 750	107, 925	6, 082, 125	196, 670
Sperm			72, 000	2, 112	501, 750	14, 718	573, 750	16, 830
Total	40, 393, 578	783, 281	20, 859, 335	431, 175	5, 107, 500	141, 759	66, 360, 413	1, 356, 215
Grand total	230, 281, 000	16, 927, 974	138, 495, 591	12, 457, 353	99, 256, 281	12, 577, 966	468, 032, 872	41, 963, 293

NOTE.—Halibut products include all taken by the Alaska fleet, some of which were landed at other than Alaska ports. The total landings in Alaska in 1934 amounted to 7,151,669 pounds, valued at $398, 337.

Supplementary table showing the pack of canned products in "standard cases"[1]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Salmon:								
Blueback, red or sockeye	104, 398	$772, 186	709, 470	$4, 896, 176	1, 814, 148	$11, 980, 292	2, 628, 016	$17, 648, 654
Chinook or king	15, 594	114, 433	28, 472	191, 207	8, 797	56, 259	52, 863	361, 899
Chum or keta	394, 212	1, 435, 921	313, 233	1, 138, 541	33, 196	127, 383	740, 641	2, 701, 845
Humpback or pink	2, 622, 362	10, 823, 571	1, 199, 872	4, 834, 099	1, 959	8, 132	3, 824, 193	15, 665, 802
Silver or coho	158, 527	834, 932	76, 371	392, 545	1, 219	6, 273	236, 117	1, 233, 750
Miscellaneous fish	238	1, 103			13	140	251	1, 243
Clams	57	144	26, 023	188, 522			26, 080	188, 666
Crabs	4, 273	71, 566	7, 067	112, 486			11, 340	184, 052
Shrimp	26	279					26	279
Total	3, 299, 687	14, 054, 135	2, 360, 508	11, 753, 576	1, 859, 332	12, 178, 479	7, 519, 527	37, 986, 190

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[1] The pack of salmon, miscellaneous fish, and crabs has been converted to "standard cases" of 48 1-pound cans, clams to "standard cases" of 48 no. 1 5-ounce cans, and shrimp to "standard cases" of 48 5¾-ounce cans.

Supplementary table showing the output of byproducts in tons and gallons

Item		Southeast Alaska		Central Alaska		Western Alaska		Total	
		Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fertilizer:									
Salmon	tons	351	$10, 530	157	$4, 703			508	$15, 233
Whale	do			665	18, 389	684	$19, 116	1, 349	37, 505
Meal, herring	do	9, 978	316, 604	3, 977	125, 613			13, 955	442, 217
Oil:									
Salmon	gallons	15, 450	9, 590	18, 270	4, 111			33, 720	13, 701
Herring	do	2, 615, 898	446, 557	1, 094, 450	187, 502			3, 710, 348	634, 059
Whale	do			379, 250	88, 745	431, 700	107, 925	810, 950	196, 670
Sperm	do			9, 600	2, 112	66, 900	14, 718	76, 500	16, 830
Total			783, 281		431, 175		141, 759		1, 356, 215

STATISTICAL SURVEY PROCEDURE

In order that those who use the statistical data contained in this report and previous reports of the Division of Fishery Industries may be informed as to the source of the figures and methods for their collection, it has been deemed advisable to outline in considerable detail the statistical survey procedure followed by the Division. This procedure has been developed over a period of years, and changes in method have been made at times where such changes have appeared to work toward general improvement. While the surveys in the several sections are not made in the same manner owing to varying facilities and records in different States, an attempt has been made to make the data collected by the various methods in the producing areas comparable with respect to the same year as well as over a period of years. Throughout the entire plan it has been the intention to coordinate State and Federal fishery statistical work so that there will be as little duplication of effort as possible. The procedure will be discussed under two main heads—"Sectional surveys" and "Local and special surveys."

SECTIONAL SURVEYS

Statistical surveys of the fisheries and fishery industries of the various sections of the United States occupy by far the greatest part of the time of the statistical personnel of the Division. It is in the course of these surveys that the statistical and marketing agents visit the individual fishing localities of the various States to collect statistics of the volume of the catch of fish and its value, employment in fishing, quantity of fishing gear, number and classification of fishing and transporting craft, employment in wholesale and manufacturing establishments, and the volume and value of manufactured fishery products and byproducts. The various phases of these surveys are discussed in detail in the sections following.

History.—The first comprehensive statistical survey of the fisheries and fishery industries of the United States was made for the year 1880 by George Brown Goode, Assistant Director of the United States National Museum and associates, with the cooperation of the Commissioner of Fisheries and the Superintendent of the Tenth Census. Data for specific fisheries or restricted sections for years prior to 1880 were also collected in this early survey and recorded in Mr. Goode's reports. The survey for 1880, however, did not include the Mississippi River and tributaries. Periodic general surveys of a limited number of States or limited areas of the United States were made for various of the intervening years between 1880 and 1908 and from 1909 to 1928. In 1908 a survey of the entire United States was made. The next general survey of the entire United States was not made until 1931 although complete data for all sections excluding the Mississippi River and tributaries were collected for 1929 and 1930 and complete data on the catch and operating units of the fisheries were collected for 1932. In the latter survey, however, lack of sufficient funds prohibited collection of data on wholesale and manufacturing firms except those data collected as a part of the canned fishery products and byproducts surveys. A complete general canvass was made of the New England, Middle Atlantic, Chesapeake, and Pacific States for 1933, and a similar canvass was made of the Chesapeake, South Atlantic, Gulf, Pacific, and Lakes States, for 1934.

Following is a summary indicating the years for which statistics were collected on the fisheries and fishery industries in the various sections. Figures for the more recent years are available for free distribution from the Bureau in bulletin form, but figures for the earlier years are available only in the various printed reports of the Bureau. These reports are available for reference in the Bureau's library and at many public libraries.

In the New England States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1889, 1898, 1902, 1905, 1908, 1919, 1924, 1928, 1929, 1930, 1931, 1932, and 1933. For most of these years data on operating units and wholesale and manufacturing trade also were collected. In addition to the above, a partial statistical survey was made for the entire section in 1892; a partial survey of the fisheries in Maine, New Hampshire, and Massachusetts for the fiscal year 1897; the lobster fishery for 1900 and 1913; the oyster fishery for 1910; the shad and alewife fisheries for 1896; the menhaden industry for 1912; the fisheries of Massachusetts for 1879; and the fisheries of Connecticut for 1925 and 1926.

Statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of the Middle Atlantic States were collected for the years 1880, 1887, 1888, 1889, 1890, 1891, 1897, 1898, 1901, 1904, 1908, 1921, 1926, 1929, 1930, 1931, 1932, and 1933. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to these a statistical survey was made of the coastal fisheries of these States in 1915; catch in all States except New York, in 1892; the shad and alewife fisheries in 1896; the shad fisheries of the Delaware River in 1910; the shad fisheries of the Chesapeake Bay and tributaries in 1909; the menhaden industry in 1912; the lobster fisheries in 1900 and 1913; and the oyster fishery in 1911. The years for which statistics are available on the shad fishery of the Hudson River are given in the section entitled "Shad and alewife fisheries."

In the Chesapeake Bay States statistics on the catch of the marine fisheries and those conducted in coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1890, 1891, 1897, 1901, 1904, 1908, 1920, 1925, 1929, 1930, 1931, 1932, 1933, and 1934. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the crab fishery for 1915; the oyster fishery and menhaden industry for 1912; and the shad and alewife fisheries for 1896, 1909, and 1915. The years for which statistics of the shad and alewife fisheries of the Potomac River are available are given in the section entitled "Shad and alewife fisheries."

In the South Atlantic and Gulf States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1889, 1890, 1897, 1902, 1908, 1918, 1923, 1927, 1928, 1929, 1930, 1931, 1932, and 1934. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the fisheries of these States, excluding Florida and Alabama, for 1887; the shad fishery of the South Atlantic

States for 1910; the shad and alewife fisheries of the South Atlantic States for 1896; the sturgeon fishery of Florida for 1900; the menhaden industry of the South Atlantic States for 1912; the shrimp fishery for 1916; the oyster fishery of the South Atlantic States for 1910; and the oyster fishery of the Gulf States for 1911.

In the Pacific Coast States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1892, 1895, 1899, 1904, 1908, 1915, and for all the years from 1922 to 1934, inclusive. These surveys have usually included data on operating units and wholesale and manufacturing trade. In addition to the above, statistics were obtained on the fisheries of California from 1918 to 1921, inclusive, and for the oyster fishery in 1912.

Statistics on the catch of the fisheries of the Great Lakes were collected for the years 1880, 1885, 1890, 1893, 1899, 1903, 1908, and for all the years from 1913 to 1934, inclusive. Statistics of the operating units and of the wholesale and manufacturing trade were collected for most of the years when canvasses were made from 1880 to 1908 and in 1917 and 1922 as well as in most of the years from 1926 to 1934, inclusive. In addition to the above a survey was made of the fisheries of Lake Ontario and of certain fisheries in other lakes for the year 1897.

Statistics of the catch of the fisheries of the Mississippi River and its tributaries were collected for the years 1894, 1899, 1903, 1908, 1922, and 1931. In addition, figures have been obtained of the fisheries of Lakes Pepin and Keokuk for the years 1914 and 1917 and the years from 1927 to 1934, inclusive, and of the fisheries of the Mississippi River between Lakes Pepin and Keokuk for the years 1929 to 1934, inclusive.

Statistics also were collected on the fisheries of certain interior waters, other than the fisheries of the Great Lakes and the Mississippi River and its tributaries, for the years 1894, 1895, 1900, and 1902.

Statistical agents.—The statistics contained in this volume have been collected by a corps of trained statistical and marketing agents which comprises a part of the permanent staff of the Division of Fishery Industries of the Bureau. Most of these men have been with the Bureau for a period of 5 years or more. In the main they are college graduates and were recruited through civil-service examination. While in college, most of the men pursued biological or technical courses largely in fishery work which has especially suited them for coping with the many biological and technical aspects encountered in canvassing the fisheries. This training has been especially helpful in identification of the species which, because of the many local names applied to a particular species, causes considerable confusion.

Period covered.—In conducting the fishery statistical surveys, agents are dispatched to the districts to be surveyed as early in the calendar year as they can be spared from the tabulation and preparation for publication of their previous season's work. They collect statistics of fishery operations for the year preceding that in which they are working; and, since their field work occupies the greater part of the year, it is usually at least a year from the end of the calendar year for which they are collecting data until the figures are published. Most of the figures are collected for the calendar year. Where there are variations from this general practice, explanatory notes appear in the tables. Prior to 1930, statistics on the catch of oysters in the Atlantic and Gulf

States were collected for the oyster season; that is, from September to April, inclusive. Beginning with 1930 and down to the present, they have been collected on the basis of the calendar year.

Scope.—The scope of the coastal statistical surveys includes canvasses of the commercial fisheries of the oceans and bays and of the coastal rivers as far inland as commercial fishing is important. This usually coincides with the range of commercial fishing for anadromous species. Statistics of the fisheries of the Mississippi River cover canvasses of the fisheries of the Mississippi River proper as well as all of its tributaries wherein commercial fishing for either fish, crustaceans, or mollusks is prosecuted. Statistics of the fisheries of the Great Lakes cover canvasses of the fisheries prosecuted in the Lakes proper, adjacent bays, and the international lakes of northern Minnesota, as well as rivers which sustain a commercial fishery having outlets into these waters. Surveys for statistics of the wholesale and manufacturing fishery industries cover such plants located in the coastal, river, and lake areas adjacent to the waters mentioned above.

Methods of collection.—Several methods for the collection of fishery statistics are employed, each of which has been carefully studied to obtain the best results with the available personnel and funds. In most instances the agents obtain lists of the names of fishing vessels, names or numbers of motor boats, and names of owners of these craft from local customs officials. Also it often is possible to obtain the names of licensed commercial fishermen and occasionally some statistics on the catch from several of the State fishery agencies; from other State, county, or city agencies; or from private organizations.

With such preliminary records as are available for their guidance the agents then visit each fishing community in their field unless their preliminary records are so complete that personal visits in some areas may be eliminated. While it is impossible for the few agents available for this work to interview each fisherman in a given locality, the more important ones are visited, and a sufficient number of those of lesser importance are interviewed to obtain reliable information on their production. In practice virtually all wholesale firms are visited, as well as captains of fishing vessels (those of 5 net tons or over), and also most of the more important inshore fishermen.

In the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained in recent years from the State fishery agencies in the collection of statistics that only fragmentary surveys need be made by the Bureau's agents to obtain the necessary data. Also the State fishery agencies in Maryland and Virginia recently have developed very complete statistical systems which greatly facilitate the Bureau's canvasses in these States.

As regards the fisheries of the Great Lakes and international lakes of northern Minnesota the Bureau obtains most of the catch statistics and usually the value of the catch direct from the records of the State fishery agency. To obtain data on the number of fishermen, boats, vessels, and gear the Bureau conducts such personal surveys among the fishermen as may be necessary to supplement the State records.

Bureau agents are stationed at Seattle, Wash., and Terminal Island, Calif., who survey the fisheries of the Pacific Coast States. As a rule they obtain figures on the volume of the catch from the records of the several State fishery agencies. In most cases the value of the catch is derived from dealers' records and sometimes from estimates of prices. In Washington and Oregon the offshore fisheries are surveyed separately by the Bureau's agent to obtain the number of operating units, catch, and value of the catch. Statistics of the wholesale fishery industry for this section are obtained largely by personal interviews of the agents.

In the administration of the Alaska fisheries the Bureau obtains sworn statements concerning their activities from those prosecuting the fisheries in this area. These statements are compiled by the Alaska Division of this Bureau.

Statistics of the volume of the catch of fish of the Pacific Coast States are usually shown in weights as landed, which may be in the round or dressed condition. Statistics on the volume of the catch of fish taken in the remainder of the United States are shown in round weight.

The figures in the tables for shellfish represent the weight of the meats in the case of univalve and bivalve mollusks and gastropods, and the round weight of crustaceans and such mollusks as squid and octupus.

Shore and vessel fisheries.—In general, statistics of the shore fisheries as collected by the agents include data, on the number of casual and regular fishermen; number and tonnage of motor and other fishing boats and accessory boats; kind and quantity of gear used, and the volume, value, and method of capture of each species caught by boats (for our purpose craft of less than 5 net tons, capacity are called "boats") for each locality or group of localities. This method is not followed in some sections where the availability of data collected by the State fishery agencies obviates the necessity of detailed locality surveys.

Statistics of the vessel fisheries include data on the number of the crew, rig of vessel, net tonnage, kind and quantity of gear used, accessory boats carried, and volume, value, and method of capture of each species caught by each vessel (for our purpose craft of 5 net tons' capacity or more are called "vessels"). As in the shore fisheries, the availability of figures collected by State fishery agencies may eliminate the necessity of our agents collecting these data for each vessel.

All persons engaged in commercial fishing operations are included as fishermen. For our purpose these have been divided into "regular" and "casual" fishermen. Regular fishermen are those who receive more than one-half of their annual income from fishing; and casual fishermen are those whose principal business is something other than fishing, and who receive less than one-half of their annual compensation from fishing.

The catch of fish is credited to the principal port of arrival and departure of the craft rather than its point of ownership, registration, documentation, or its port of landing. This accounts for catches of fish being shown in areas where they are not common since fishing vessels frequently fish in areas far from their principal fishing port.

Wholesale and manufacturing trade.—All persons or firms engaged in the wholesale buying and selling of fishery products or who produce manufactured fishery products are surveyed under this title. Where the business of fishing and wholesaling or manufacturing is combined, that part of the business devoted to either of the latter two phases is included in the wholesale and manufacturing survey and the part devoted to fishing is included in the shore or vessel fisheries. If a wholesale business is conducted with no manufacturing and the business is so small that the full time of one man over the whole year or season is not required, it is then disregarded as a wholesale business. If commodities other than fishery products are handled the persons engaged, and salaries and wages paid, are prorated; and only that part concerned with fishery products is included. If such a firm requires less than the full time of one man over the whole year or season and if it does not manufacture, it is not included in the canvass. Retail firms that manufacture or whose wholesale business exceeds the retail part are included. Persons or firms engaged in the motor trucking of fishery products are included as wholesalers if they are engaged in wholesale buying and selling.

Buyers for a central firm are not canvassed as wholesale dealers unless they ship direct to the firm's customers from the buying point.

Fishermen or fishing concerns, except manufacturers, who do not buy fishery products are not included under this heading except that oyster-shucking firms are included provided shuckers are employed and irrespective of whether all or part of the oysters used are taken from the firms' privately owned beds.

Manufacturing concerns include those which prepare packaged fishery products; salted, spiced, smoked, dried, or otherwise cured fishery products; canned fishery products; or fishery byproducts.

Fishermen who manufacture are surveyed to obtain the number of persons so employed and the volume and value of the products prepared.

In collecting statistics of manufacturing firms the agents obtain data on the production for each plant in producing areas of products as marketed by the plant. Such products are usually "final" and in form for consumption; however, the products may be "intermediate" and require further processing before reaching the consumer markets. An outstanding example of an intermediate product is green-salted ground fish which almost invariably is further processed before final marketing. In reviewing the statistics of manufactured products it should be observed that intermediate products are not shown where they are prepared to the final stage in the original plant. An exception to this rule, however, is in the case of the production of mild-cured salmon which on account of its importance is shown in its entirety whether further processed in the producing plant or not. In this connection it should also be stated that several of the byproducts for which statistics are shown may be intermediate and the plants producing the final products are not surveyed by this Bureau. Outstanding among such products are marine-animal oils, scrap, and meal.

Statistics of persons engaged in wholesale and manufacturing establishments are reported in three groups: Proprietors, salaried employees, and wage earners.

Proprietors represent those persons who devote their time to the conduct of the enterprise and receive their compensation in the form of profits. Managers of branch houses are not classified as proprietors.

Salaried employees usually include those persons paid by the week or month while wage earners usually consist of those paid on a per diem or piece-work basis. This, however, is not true in all cases, since the distinction between these two classes depends primarily on the character of the work done rather than the unit of time employed for calculating rates of pay. In general, office employees are classified as salaried employees. Other employees, including plant workmen, are classed as wage earners. Plant foremen or superintendents are classified as salaried employees unless they are principally engaged in manual labor, in which case they are classified as wage earners. Active officers of corporations are classified as salaried employees. Statistics of wage earners are shown in two forms: The average number employed during the operating season; and the average number employed during the year (the monthly average for the year).

Transporting trade.—Statistics are obtained on the number of the crew and number of boats and vessels engaged in transporting fishery products from the fishing grounds to port or from port to port. However, if a craft is engaged in catching fish at any time of the year it is included as a fishing craft rather than as a transporter.

Publication of data.—Statistics of employment in the fisheries, craft and gear engaged, catch and value of catch, and certain data on industries related to the fisheries are summarized and published in bulletin form as soon as possible after completion of each survey. Later the figures in more detail are included in the annual reports of the Division.

LOCAL AND SPECIAL SURVEYS

Landings at certain important United States ports.—Statistics of the landings of aquatic products at the principal New England ports (Boston and Gloucester, Mass., and Portland, Maine) are obtained in a similar manner. An agent is permanently stationed at each of these ports. His duties include the obtaining of figures daily on the quantity of fish landed by each fishing vessel, the value of such fish landed, information concerning the date of departure and arrival of the vessel, and he also indicates the grounds from which the fish were taken and gear used in their capture. These data are forwarded to the Bureau, where compilations are made. Products of American fisheries received duty free at Boston and Gloucester, Mass., and Portland, Maine, from the treaty coasts of Newfoundland, Magdalen Islands, and Labrador are included in the landings at these ports; however, they are not included in the catch in sectional fishery surveys of the New England States unless they represent a catch by United States vessels. Statistics of these landings are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Data on the landings at Boston, and Gloucester, Mass., have been collected annually since 1893, and those for Portland, Maine, since June 1915. Some data are available for Boston and Gloucester prior to 1893.

Statistics of the landings of fish at Seattle, Wash., are collected by the Bureau's agent in that city. Landings are classified as those made by American fishing vessels and those received by Seattle wholesale dealers. The landings credited to United States fishing vessels are made by vessels operating distinctly as primary fishing units, usually in the offshore fisheries, while those credited as received by wholesale dealers are usually products of the shore fisheries collected mainly from points in Puget Sound and do not include fish received from Alaska or Canada, or landings made by the halibut fleet. Statistics of these landings at Seattle are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Statistics of the landings by fishing vessels at Seattle have been collected since June 1915 and certain data on products received by Seattle wholesale dealers since December 1915.

Statistics of the fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department in Washington. They are not published in bulletin form, but a summary of the year's activities is published in the annual reports of the Division. Data on products handled at the municipal wharf are available since 1921.

Atlantic mackerel fishery.—Statistics on the catch by the Atlantic mackerel fleet are obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Maine, with those obtained by Bureau agents, who in recent years have been stationed at other Atlantic ports where mackerel are landed. These agents obtain data on the volume of mackerel landed in a manner similar to that used to obtain figures on the landings by fishing vessels at the three New England ports. The figures include only the catches made by purse seine and drift gill net craft and are not complete for craft of under 5 net tons' capacity using this type of gear. Statistics of this fishery appear only in the annual reports of this Division, although the landings at the principal New England ports appear in the monthly and annual bulletins published for those ports. Statistics of this fishery are available from 1905 to 1934, inclusive.

Shad and alewife fisheries.—Owing to the importance of the Hudson and Potomac Rivers in the production of shad, surveys for statistics of the catch, value of the catch, and operating units are made annually. On the Potomac River similar statistics also are obtained for the alewife fishery. Much of the data required for these surveys are available from the State fishery agencies.

Statistics of the shad and alewife fisheries are not published separately in bulletin form, but a summary of the year's activities is published in the annual reports of the Division.

Statistics of the shad fishery of the Hudson River are available for 1896, 1897, 1898, 1901, 1904, 1910, and from 1915 to 1934, inclusive, while data for the shad fishery of the Potomac River are available for 1896, 1901, 1904, 1909, 1915, and from 1919 to 1934, inclusive. Statistics of the alewife fishery of the Potomac River are available for 1896, 1909, 1915, and from 1919 to 1934, inclusive.

Pacific halibut fishery.—Statistics of the Pacific halibut fishery are obtained by the Bureau's agent in Seattle, aided by Bureau representatives in Alaska and the International Fisheries Commission. The fleet classification has been arbitrarily applied by including in the "Washington fleet" all United States and Alaska vessels that land more than half of their catch in that State. All other United States and Alaska vessels of the halibut fleet are included in the "Alaska fleet." Monthly and annual statistical bulletins are available on this fishery, being published along with the statistics of the landings of fishery products at Seattle, Wash., and detailed statistics are published in the annual reports of the Division. Statistics of the landings of halibut at Pacific coast ports have been collected since 1925.

Canned fishery products and byproducts.—Beginning in 1921, the Bureau has made annual surveys for statistics of the canned fishery products and byproducts industries of every section. These are begun the first week in January of each year for statistics of the production in the preceding year. The surveys usually occupy 6 to 9 weeks' time. During this period the Bureau obtains by mail, so far as possible, the production of canned fishery products or byproducts from each plant in the United States engaged in this business. Where it is impossible to obtain reports by mail the report is obtained by personal visit by the Bureau's agents. They obtain statistics of the production and value of the production for each commodity. Statistics of the canned fishery products and byproducts produced in Alaska are received on the same statements obtained by the Bureau that include statistics of their general fishery operations.

An annual statistical bulletin is issued on this trade, and detailed statistics of the output are published in the annual reports of the Division. In addition to the data obtained on the output of these products annually since 1921, data also usually were obtained prior to 1921 for the years the various sections were surveyed.

The value shown for canned products constitutes the gross amount received by the packer at the production point, no deductions being made for commission or expenses.

Packaged-fish trade.—Complete statistics of the annual production and value of fish packaged in the United States are obtained as a part of the survey for the statistics of the canned fishery products and byproducts industries. These statistics are released in bulletin form annually and detailed statistics are published in the annual reports of the Division. Statistics of the production of packaged fish are available for 1926 and the years from 1928 to 1934, inclusive.

Cold-storage holdings of fish.—An arrangement has been made with the Bureau of Agricultural Economics, Department of Agriculture, whereby statistics of the cold-storage holdings of the various species of fish, by sections of the United States, are furnished to this Bureau monthly. Included with statistics of the holdings are statements of the quantity of the various species of fish frozen and also the holdings of certain cured fish. Bulletins showing these statistics are issued monthly as well as annually, and detailed statistics are published in the annual reports of this Division. Statistics of cold-storage holdings of fishery products have been published since 1917 and data on quantities of fish frozen, for the years from 1920 to 1925, inclusive, and from 1928 to 1934, inclusive.

Sponge market, Tarpon Springs.—A large proportion of the total output of sponges in Florida is handled through the sponge exchange at Tarpon Springs. In view of this, the Bureau has obtained from a representative of the exchange annual statistics of the quantity and value of the sponges, by variety classification, handled through it annually. Statistics of the quantity of sponges handled through the exchange are not published in bulletin form, but a summary of the year's activities is published in the annual reports of this Division. Statistics of the transactions on the sponge exchange are available for 1913, 1914, and for the years from 1917 to 1934, inclusive.

Foreign fishery trade.—Statistics of the foreign fishery trade are obtained from compilations made by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Statistics of all known fishery products imported or exported have been assembled in one table and published annually in the reports of the Division in recent years. For earlier years they are available in the reports of the Bureau of Foreign and Domestic Commerce, the Bureau of Statistics, the Department of Commerce and Labor, and the Treasury Department.

PRACTICES AND TERMS

Certain practices and terms of importance used in the compilation of fishery statistics are explained below.

Days absent.—In computing "days absent" for vessels landing fares at the various ports, the day of departure and the day of arrival are included; thus, a vessel leaving port on the 8th of the month and returning on the 15th of the month will be shown as being absent 8 days.

Operating units.—Operating units as referred to in this document include persons engaged in the fisheries and fishing craft and gear employed.

Vessel.—The term "vessel" refers to a craft having a capacity of 5 net tons or more.

Boat.—The term "boat" refers to a craft having a capacity of less than 5 net tons.

Incidental catch.—The term "incidental catch" refers to the catch of certain species by a type of gear which ordinarily does not capture such species.

Percentages.—Percentages are usually shown as whole numbers. Fractions of percents are dropped if less than five-tenths, and the percentage is raised to the next higher integer if the fraction is greater than five-tenths. If the fraction is exactly five-tenths, the integer is raised or lowered to make it an even number.

Converting.—Many of the figures shown in the statistical tables published herewith have been reduced to thousands of pounds or dollars. In making these conversions the largest number from which a group of items is computed is raised or lowered to the nearest thousands place. If the number ends in an even 500, the thousands integer is raised or lowered to make it an even number. The individual items are changed to conform to the total thus obtained.

Confidential data.—The statistical data collected by the Division are confidential and are not released except by approval of the Washington office. Statistics of production of wholesale and manufacturing firms are published only for commodities or geographical areas where the production of three or more concerns may be grouped. Every effort is made to publish only those figures which will not reveal individual enterprise.

CONVERSION FACTORS

It is the policy of the Bureau to show the detailed catch figures of all products in pounds for the sake of uniformity and for purposes of comparison. Following such a policy presents certain problems. In the case of fish there is little difficulty since in very rare instances are such products reported in units of measure other than pounds. For shellfish, however, the units of measure may be bushels, sacks, barrels, or thousands of shellfish, gallons of meats, etc. These many units make standardization difficult, but when coupled with the wide variation in the requirements or definition of some of these units in the various States the problem becomes even more complex.

All bivalve mollusks are reported in pounds of meats in the detailed catch tables presented in this report. In addition, there are included supplementary tables for most of the sections, which give data on the production in bushels. These supplementary tables also give the production of certain other shellfish, such as crabs, in number.

Oysters.—Probably the greatest problem in presentation of fishery statistics in uniform units of measure is in the case of oysters. Usually the production of oysters on the Atlantic and Gulf coasts is reported to Bureau agents in bushels; and prior to the data obtained for the year 1930 conversion from bushels to pounds of meats was effected on the basis of a uniform yield of 7 pounds of meats to the bushel. However, recent investigations have shown considerable variation from this figure. There follows a table which gives the results of these studies of the measures used for oysters in the various States and of the average yields per bushel. This table presents the factors that have been used in the oyster statistics given in this report.

Measures and yields of oysters [1]

State	Capacity of State bushel	Variation from United States standard bushel		Market oysters	
				Yield per State bushel	Yield per standard bushel
	Cubic inches	*Cubic inches*	*Percent*	*Pounds of meats*	*Pounds of meats*
Massachusetts	2, 150. 4	------------	------------	6. 57	6. 57
Rhode Island	2, 150. 4	------------	------------	6. 96	6. 96
Connecticut	2, 150. 4	------------	------------	6. 81	6. 81
New York	2, 150. 4	------------	------------	7. 00	7. 00
New Jersey	2, 257. 3	+106. 9	+5. 0	8. 70	8. 29
Delaware	2, 257. 3	+106. 9	+5. 0	7. 88	7. 50
Maryland	2, 801. 5	+650. 1	+30. 2	6. 24	4. 79
Virginia	3, 003. 4	+853. 0	+39. 7	6. 32	4. 53
North Carolina	2, 801. 9	+651. 5	+30. 3	5. 58	4. 28
South Carolina	4, 071. 5	+1, 921. 1	+89. 3	4. 74	2. 50
Georgia	2, 753. 4	+603. 0	+28. 0	5. 88	4. 59
Florida	3, 214. 1	+1, 063. 7	+49. 4	3. 57	2. 39
Alabama	2, 826. 2	+675. 8	+31. 4	3. 29	2. 50
Mississippi	2, 826. 2	+675. 8	+31. 4	2. 22	1. 69
Louisiana	2, 148. 4	−2. 0	−0. 1	4. 32	4. 32
Texas	2, 700. 0	+549. 6	+25. 6	4. 41	3. 51

[1] Data for the Chesapeake, and the South Atlantic and Gulf States are for 1934. Other data are for 1933.

Other mollusks.—The following table shows the conversion factors for various mollusks, other than oysters, used in this report.

Average yields of certain mollusks in pounds of meats per bushel [1]

State	Clams, hard		Clams, soft, public	Clams, surf	Clams, razor	Mussels, sea	Periwinkles and cockles	Scallops, bay	Scallops, sea	Conchs
	Public	Private								
Maine	11	--------	15	--------	--------	12	18	--------	6	--------
Massachusetts	11	11	15	17	32	10	18	6	6	--------
Rhode Island	11	11	16	--------	--------	13	18	6	--------	--------
Connecticut	10	--------	14	--------	--------	--------	--------	5. 75	6	--------
New York	8	8	16	12	--------	10	--------	5	6	18
New Jersey	8. 96	8. 96	20	12. 5	--------	13	11. 85	6	6	18
Delaware	10	10	--------	--------	--------	--------	--------	--------	--------	--------
Maryland	8	--------	--------	--------	--------	--------	--------	--------	--------	--------
Virginia	8	--------	--------	--------	--------	13	--------	--------	6	--------
North Carolina	8	--------	--------	--------	--------	--------	--------	6	--------	--------
South Carolina	8	--------	--------	--------	--------	--------	--------	--------	--------	--------
Florida	8	--------	--------	--------	--------	--------	--------	5. 3	6	5

[1] Data for the Chesapeake, and South Atlantic and Gulf States are for 1934. Other data are for 1933.

Other conversion factors.—The principal other conversion factors that have been used in this report are as follows:

Alewives	To convert number of fish to weight in pounds, multiply by 0.4.
Cod, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Cod, market, salted	To convert to fresh-gutted weight, multiply by 1.94.
Cod, scrod, salted	To convert to fresh-gutted weight, multiply by 1.98.
Crustaceans:	
Crabs, soft (New York, Maryland, and Virginia)	To convert number of crabs to weight in pounds, divide by 4.
Crabs, soft (Louisiana)	To convert number of crabs to weight in pounds, divide by 2.53.
Crabs, soft (other States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, hard (Georgia)	To convert number of crabs to weight in pounds, divide by 2.
Crabs, hard (Florida)	To convert number of crabs to weight in pounds, divide by 1.91.
Crabs, hard (Alabama)	To convert number of crabs to weight in pounds, divide by 1.71.
Crabs, hard (Mississippi)	To convert number of crabs to weight in pounds, divide by 1.97.
Crabs, hard (Louisiana)	To convert number of crabs to weight in pounds, divide by 2.21.
Crabs, hard (Texas)	To convert number of crabs to weight in pounds, divide by 2.18.
Crabs, hard (other States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, stone	To convert number of crabs to weight in pounds multiply by 1.25.
Cusk, salted	To convert to fresh-gutted weight, multiply by 1.90.
Haddock, large, salted	To convert to fresh-gutted weight, multiply by 2.06.
Haddock, scrod, salted	To convert to fresh-gutted weight, multiply by 2.10.
Hake, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Hake, small, salted	To convert to fresh-gutted weight, multiply by 1.98.
Halibut, salted	To convert to fresh-gutted weight, multiply by 2.
Herring, salted	To convert to round weight, multiply by 1.50.
Mackerel, salted	To convert to round weight, multiply by 1.35.
Menhaden	To convert number of fish to weight in pounds, multiply by 0.6.
Oil (east coast)	To convert gallons to pounds, multiply by 7.74.
Oil (west coast)	To convert gallons to pounds, multiply by 7.5.
Pollock, salted	To convert to fresh-gutted weight, multiply by 1.90.
Sponges, dried (Florida):	
Large wool	To convert number of bunches to weight in pounds, multiply by 3.5.
Medium wool	To convert number of bunches to weight in pounds, multiply by 1.75.
Small wool	To convert number of bunches to weight in pounds, multiply by 1.
Wool rags	To convert number of bunches to weight in pounds, multiply by 2.25.
Grass	To convert number of bunches to weight in pounds, multiply by 1.
Wire	To convert number of bunches to weight in pounds, multiply by 1.5.
Yellow	To convert number of bunches to weight in pounds, multiply by 1.25.

COMMON AND SCIENTIFIC NAMES OF FISHERY PRODUCTS

In order to prevent misunderstanding in the use of common names employed in the tables and discussions, the following list of common and scientific names is given:

Common and scientific names of the commercial fishery products caught in the United States and Alaska

Common name as shown in Bureau reports	Other common names	Scientific names
Albacore	Longfin tuna	*Germo alalunga* (Pacific coast).
Alewives	Branch herring, wall-eyed or big-eyed herring	*Pomolobus pseudoharengus.*
	Blueback, glut herring	*Pomolobus aestivalis.*
Amberjack		Seriola species.
Anchovies		*Engraulis mordax.* *Anchoviella delicatissima.* *Anchoviella compressa.*
Anglefish		*Pomacanthus arcuatus.* *Angelichtys isabelita.*
Barracuda		*Sphyraena argentea* (Pacific coast). *Sphyraena barracuda* (Atlantic coast).
Black bass	Smallmouth bass	*Micropterus dolomieu.*
	Largemouth bass	*Micropterus salmoides.*
Bluefish	Tailor	*Pomatomus saltatrix.*
Blue pike	Pike perch, blue pickerel (Canada).	*Stizostedion glaucum.*
Blue runner or hard-tail.	Runner	*Caranx crysos.*
Bonito		*Sarda sarda.* *Sarda chiliensis.*
Bowfin		*Amia calva.*
Buffalofish		Ictiobus species.
Bullhead		Ameiurus species.
Butterfish	Dollarfish	*Poronotus triacanthus.*
Burbot	Lawyer, ling	*Lota maculosa.*
Cabio	Coalfish, crab eater, cobia	*Rachycentron canadus.*
Cabrilla	Rock bass	*Epinephelus analogus* (Pacific coast).
Carp	German carp	*Cyprinus carpio.*
Catfish		Siluridae species.
Cero		*Scomberomorus regalis.*
Chubs	Tullibee in Canada; longjaw, bluefin, blackfin in United States.	All *Leucichthys* except *artedi* (in Great Lakes).
Cigarfish	Scad	Decapterus species.
Cisco	Herring in Canada	*Leucichthys artedi* (Lake Erie only).
Cod	Codfish	*Gadus macrocephalus* (Pacific coast). *Gadus callarias* (Atlantic coast).
Corbina	Orange mouth corbina	*Cynoscion xanthulum.*
Crappie	White crappie	*Pomoxis annularis.*
	Black crappie, strawberry bass, calico bass.	*Pomoxis sparoides.*
Crevalle		*Caranx hippos.*
Croaker	Crocus, hardhead	*Micropogon undulatus.*
Cunner	Chogset, blue perch, bergall.	*Tautogolabrus adspersus.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Cusk		*Brosmius brosme.*
Cutlassfish	Ribbonfish	*Trichiurus lepturus.*
Dolly Varden trout	Salmon trout, bull trout	*Salvelinus parkei.*
Dolphin		*Coryphaena hippurus.*
Drum:		
Black		*Pogonias cromis.*
Red	Channel bass, redfish, spotted bass.	*Sciaenops ocellatus.*
Eels:		
Common		*Anguilla rostrata.*
Conger		*Leptocephalus conger.* Gymnothorax species.
Flounders	Dabs, blackbacks, lemon sole, winter flounder, summer flounder.	Pleuronectidae species.
	Halibut, "California"	*Paralichthys californicus.*
	Sole	*Psettichthys melanostictus* (Pacific coast).
Flyingfish		*Cypsilurus californicus.*
Frigate mackerel	"Boo Hoo"	*Auxis thazard.*
Garfish		(See sea gar.)
Gizzard shad	Nanny shad, mud shad	*Dorosoma cepedianum.*
Goldeye		Hiodon species.
Goldfish	Sand perch	*Carassius auratus.*
Goosefish		*Lophius piscatorius.*
Grayfish	Dogfish	*Squalus sucklii* (Pacific coast).
	Spiny dog	*Squalus acanthias.*
	Smooth dog	*Mustelus mustelus.*
Groupers	"Sea bass"	Epinephelus species. Mycteroperca species.
Grunts	Margatefish, sailors choice (Key West).	Haemulon species.
Haddock		*Melanogrammus aeglefinus.*
Hagfish	Slimefish	*Myxine glutinosa.*
Hake	Squirrel hake, Boston hake, ling, black hake, mud hake.	Urophycis species (Atlantic coast).
	Merluccio	*Merluccius productus* (Pacific coast).
Halibut		*Hippoglossus hippoglossus.*
Hardhead		*Orthodon microlepidotus* (Pacific coast).
Harvestfish	Starfish, pappyfish; butterfish (N. C.).	*Peprilus alepidotus.*
Herring:		
Lake	Herring	*Leucichthys artedi* (Great Lakes, except Erie).
Round		*Etrumeus sadina.*
Sea		*Clupea harengus* (Atlantic coast). *Clupea pallasii* (Pacific coast).
Herring smelt	Sea smelt	*Argentina silus.*
Hickory shad	Tailor shad	*Pomolobus mediocris.*
Hogfish	Capitaine, perro perro	*Lachnolaimus maximus* (Florida).
Horse mackerel		*Trachurus symmetricus* (Pacific coast).

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Jewfish		*Promicrops itaiara.*
Kingfish		*Scomberomorus cavalla* (Atlantic coast).
	Little roncador, croaker	*Genyonemus lineatus* (California).
King whiting	Northern whiting, kingfish, seaming.	Menticirrhus species.
Ladyfish	Bonefish	*Albula vulpes.*
Lake trout		*Cristivomer namaycush.*
Launce	Sand eel, lant, sand launce.	*Ammodytes americanus.*
"Lingcod"	Cultus cod, blue cod, buffalo cod, ling.	*Ophiodon elongatus.*
Mackerel		*Scomber scombrus* (Atlantic coast). *Scomber diego* (Pacific coast).
Marlin	Spearfish	*Tetrapturus mitsukurii* (Pacific coast).
Menhaden	Mossbunker, pogy	*Brevoortia tyrannus.*
Minnows		Cyprinidae species.
Mojarro		Eucinostomus species.
Mooneye	Toothed herring	Hiodon species.
Moonfish		*Vomer setipinnis.* *Selene vomer.*
Mullet	Jumping mullet	*Mugil* species.
Mummichog	Mayfish, killifish	*Fundulus* species.
Muttonfish		*Lutianus analis.*
Paddlefish	Spoonbill cat	*Polyodon spathula.*
Parrotfish		Scaridae species.
Perch (California)		(See surf fishes.)
Permit	Great pompano	*Trachinotus goodei.*
Pigfish	Hogfish (N. C.)	*Orthopristis chrysopterus.*
Pike or pickerel	Great Lakes pike	*Esox reticulatus.* *Esox lucius.*
Pilchard	Sardine	*Sardina caerulea.*
Pilotfish		*Naucrates ductor.* *Seriole zonata.*
Pinfish	Bream, salt-water bream	*Lagodon rhomboides.*
Pollock		*Pollachius virens.*
Pompano		*Trachinotus* species (Atlantic coast). *Palometa simillima* (Pacific coast).
Porgies	Porgee	*Calamus* species.
Porkfish	Sisi	*Anisotremus virginicus.*
Quillback	Spearfish or skimfish	*Carpiodes* species.
Roach	Shiner	*Notemigonus crysoleucas.*
Rock bass	Redeye, goggle-eye	*Ambloplites rupestris* (Mississippi River to Atlantic seaboard).
	Groupers	*Paralabrax nebulifer* (Pacific coast).
Rockfishes	Rock cod	*Sebestodes* species (Pacific coast).
Rosefish		*Sebastes marinus.*
Rudderfish	Blue bass, greenfish	*Girella nigricans* (Pacific coast).
	Halfmoon	*Medialuna californiensis* (Pacific coast).

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Sablefish	Black cod	*Anaplopoma fimbria.*
Salmon:		
Atlantic		*Salmo salar* (Atlantic coast).
Pacific:		
Blueback, red, or sockeye.		*Oncorhynchus nerka.*
Chinook or king.	Tyee, Columbia, Sacramento, spring.	*Oncorhynchus tschawytscha.*
Chum or keta.	Dog salmon	*Oncorhynchus keta.*
Humpback or pink.		*Oncorhynchus gorbuscha.*
Silver or coho		*Oncorhynchus kisutch.*
Steelhead	See steelhead trout.	
Sauger	Sand pike	*Stizostedion canadense.*
Sawfish		*Pristis pectinatus.*
Sculpin		Cottidae species.
Scup	Paugy or porgy, fair maid.	*Stenotomus* species.
Sea bass	Black jewfish or black sea bass.	*Stereolepis gigas* (Pacific coast).
	Black sea bass	*Centropristes striatus* (Atlantic coast).
	White sea bass	*Cynoscion nobilis* (Pacific coast).
Sea catfish	Gafftopsail	*Bagre marina.*
Sea gar	Needlefish, billfish, houndfish.	*Tylosurus* species.
Sea robin		*Prionotus* species.
Shad	American shad	*Alosa sapidissima.*
Sharks		*Carcharodon* species: *Mustelus* species; *Carcharhinus* species; *Sphyrna* species.
Sheepshead		*Archosargus probatocephalus* (Atlantic coast).
	Drum, fresh-water	*Aplodinotus grunniens* (fresh water).
	Redfish, flat head	*Pimelometopon pulcher* (Pacific coast).
Silver perch	Sand perch	*Bairdiella chrysura.*
Silversides	Spearing	*Menidia* species.
Skates		*Raja* species.
Skipper	Billfish	*Scomberesox saurus.*
Smelts		*Osmerus mordax* (Atlantic coast).
		Argentinidae species (Pacific coast).
	Eulachon	*Thaleichthys pacificus.*
Snapper:		
Mangrove	Gray snapper	*Lutianus griseus.*
Red		*Lutianus blackfordii.*
Snook	Robalo, sergeantfish	*Centropomus undecimalis.*
Spadefish	Porgy (N. C.)	*Chætodipterus faber.*
Spanish mackerel		*Scomberomorus maculatus.*
Splittail		*Pogonichthys macrolepidotus.*
Spot	Lafayette, goody	*Leiostomus xanthurus.*
Squawfish	Sacramento pike	*Ptychocheilus grandis.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Squeteague:		
Gray	Gray trout, weakfish, trout.	*Cynoscion regalis.*
Spotted	Spotted weakfish, spotted trout.	*Cynoscion nebulosus.*
White	Sand trout	*Cynoscion aremarius.*
Squirrelfish		*Diplectrum formosum.*
Squirrel hake	See hake.	
Steelhead trout	Salmon trout	*Salmo gairdneri.*
Striped bass	Rockfish, rock	*Roccus lineatus.*
Sturgeon		*Acipenser* species.
Sturgeon, shovelnose		*Scaphirhynchus platorynchus.*
Sucker	Fresh-water mullet	Catostomidae species.
Sunfish		*Lepomis* species. Centrarchidae species.
Surf fishes		Embiotocidae species.
Swellfish	Puffer, swell toad, balloonfish, globefish.	*Spheroides maculatus.*
Swordfish		*Xiphias gladius.*
Tai		*Calumus brachysomus.*
Tautog	Blackfish, oysterfish	*Tautoga onitis.*
Tenpounder	Elops	*Elops saurus.*
Thimble-eyed mackerel.	Bullseye	*Scomber colias.*
Tilefish		*Lopholatilus chamæleonticeps.*
Tomcod		*Microgadus tomcod* (Atlantic coast). *Microgadus proximus* (Pacific coast).
Tripletail		*Lobotes surinamensis.*
Tullibee		(See chubs.)
Tuna and tunalike fishes:		
Albacore	Longfin tuna	*Germo alalunga.*
Bluefin	Tuna, leaping tuna (Pacific coast). "Horse mackerel" (Atlantic coast).	*Thunnus saliens.* *Thunnus secundodorsalis.*
Bonito		*Sarda sarda* (Atlantic coast). *Sarda chiliensis* (Pacific coast).
Skipjack	Striped tuna	*Euthynnus pelayms.*
Yellowfin		*Neothunnus macropterus.*
Turbot	Greenland halibut American turbot	*Reinhardtius hippoglossoides* (off New England). *Balistes carolinensis* (off Florida).
White bass	White lake bass	*Roccus chrysops.*
Whitebait	Small fry of any fish.	
Whitefish:		
Common		*Coregonus clupeiformis* (Great Lakes). *Caulolatilus princeps* (Pacific coast).
Menominee		*Prosopium quadrilaterale*
White perch		*Morone americana* (Atlantic coast).
Whiting	Silver hake	*Merluccius bilinearis.*
Wolffish		*Anarhichas lupus.*
Yellow perch		*Perca flavescens.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Yellow pike	Wall-eyed pike, pike perch, dore.	*Stizostedion vitreum.*
Yellowtail		*Ocyurus chrysurus* (Atlantic coast). *Seriola dorsalis* (Pacific coast).
Crabs:		
Hard	Hard-shell crab, blue crab	*Callinectes sapidus.*
	Dungeness crab	*Cancer magister* (Pacific coast).
	Rock crab, hard crab	*Cancer irroratus* (Atlantic coast).
Soft	Soft-shelled crab, blue crab.	*Callinectes sapidus.*
King	Horseshoe crab	*Limulus* (Atlantic coast).
Stone		*Menippi mercenaria.*
Crawfish:		
Fresh-water	Crayfish	Cambarus species (Atlantic coast). Astacus species (Pacific coast).
Sea	Rock lobster, crayfish	*Panulirus argus* (Atlantic coast). *Panulirus interruptus* (Pacific coast).
Lobsters:		
Common		*Homarus americanus* (Atlantic coast).
Spiny	(See sea crawfish.)	
Shrimp		*Peneus setiferus.* *Peneus brasiliensis* (Atlantic and Gulf coasts). Pandalus species (Pacific coast). Pandalopsis species (Pacific coast). Crangon species (Pacific coast).
Abalone		Halotis species.
Clams:		
Cockle		*Cardium corbis* (Pacific coast).
Hard	Butter	*Saxidomus nuttall.*
	Round clam, cherrystone, quahog, little neck.	*Tivela stultorum* (Pacific coast). *Venus mercenaria* (Atlantic coast). *Venus mortoni* (Florida coast).
Pismo		*Tivela stultorum* (Pacific coast).
Razor		Enis species (Atlantic coast). *Siliqua patula* (Pacific coast).
Soft	Softshell clam, sand clam, nannynose, maninose.	Mya arenaria.
Surf	Skimmer	*Mactra solidissimo.*
Cockles	Moonshell	*Natica heros* (Atlantic coast).
Conchs		Strombus species. Busycon species.

Common and scientific names of the commerical fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Coquina	Pompano shells	*Donax variabilis.*
Mussels:		
Sea		*Mytilus californianus* (Pacific coast). *Mytilus edulis.*
Fresh water		Quadrula species. Lampsilis species. Unio species. Symphynota species.
Octopus		*Octopus punctatus* (Pacific coast).
Oysters:		
Eastern		*Ostrea virginica*
Western	Olympia	*Ostrea lurida* (Pacific coast).
Japanese (introduced).	Pacific	*Ostrea gigas.*
Periwinkles		Littorina species.
Scallops:		
Bay		*Pecten irradians* (Atlantic coast). *Pecten aequisulcatus* (Pacific coast).
Sea		*Pecten magellanicus.*
Squid		*Loligo opalescens* (Pacific coast). *Loligo pealei* (Atlantic coast).
Sea urchins		Echinoidea.
Terrapin	Diamond-back terrapin	Malaclemmys species.
Turtles:		
Green		*Chelonia mydas.*
Loggerhead		*Thalassochelys caretta.*
Hawksbill		*Chelonia inbricata.*
Snapping	Hard shell, alligator turtle	*Chelydra serpentina.* *Macrochalys lacertina.*
Soft shell		Trionyx species.
Frogs		Rana species.
Irish moss		*Chrondrus crispus.*
Kelp		Macrocystis species; Nereocystis species; Pelagophycus species; Alaria species.
Sponges:		
Glove		*Spongia graminea* (Hyatt) *Euspongia officianalis* (L.).
Grass		*Hippospongia equina cerebriformis.*
Sheepswool		*Hippospongia canaliculata gossypina.*
Yellow		*Hippospongia equina elastica.*
Trepang	Sea cucumber	*Cucumaris frondosa; Thyone briareus.*

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1936[1]

By Glen C. Leach, *Chief*, and M. C. James, *Assistant Chief, Division of Fish Culture*

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INTRODUCTION

The production of fish and eggs at Federal hatcheries exceeded any previous year since their inception. There appear elsewhere tabulations and summaries showing the details of this production. The total output amounted to 8,171,000,000 in comparison with 5,071,000,000 of the previous year. It is essential to review these separate statements in order to acquire a clear conception of the exact nature of such a diverse activity, ranging from the planting of fertilized cod eggs on the inshore New England banks to stocking 1-acre cattle tanks with pan fish.

Developments of the past several years have had an interesting bearing upon a matter which is occasionally the subject of critical comment. This is the phase of the Bureau's policy which permits the allocation of fish to so-called private waters, meaning streams or ponds to which the entire public does not have free or unlimited access. The Bureau's policy does not contemplate furnishing fish to exclusive angling clubs or to projects which may be directly commercialized.

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[1] Administrative Report No. 25, Appendix III to the Report of the U. S. Commissioner of Fisheries for 1936. Approved for publication Jan. 5, 1937.

It does, however, involve the stocking of waters where private riparian rights may be exercised to exclude the general public. This policy has been based upon the knowledge that the overflow from such private waters will go to stock public streams and the private waters frequently serve as more or less well protected nursery areas. Furthermore, the land owner and his friends, having satisfactory fishing in their own waters, are not frequenting the heavily fished public streams.

Further justification for this policy has been observed in the widespread construction of small reservoirs and ponds, particularly through drought areas, in the last several years. Many of these are strictly private and need not be opened to public fishing. It would be an extreme attitude, however, to hold that these hundreds or thousands of square miles of new waters should go unstocked and fishless because the land owners do not make them accessible to the entire public. At a time when public fishing waters are actually congested with anglers, any step which will relieve some of this pressure is in the interest of conservation. It is, therefore, felt fortunate that the Bureau is empowered to provide fish for these new lakes, pools, and reservoirs, whether they be constructed under public or private auspices.

There has been no general modification of the organization or procedure in the conduct of the Federal hatchery system during the past year. Greater attention has been given to an effort to follow through right up to the actual disposition of the fish in the lakes and streams. A hatchery fish improperly planted or placed in suitable waters is an unfinished product and the effort and money expended previously will have been wasted. To the sportsmen in particular, who have cooperated so well, the Bureau is indebted for material aid in developing a more rational system of stocking.

SPECIES PROPAGATED

The list of species handled at the Federal hatchery constitutes a cross section of the most important food and game fishes of the interior and coastal waters of the United States. The kinds handled number the same as during the previous year, namely 43 separate species. There was one change in that the white perch were not propagated during the year but were replaced by a resumption of the hatching of lake herring on Lake Ontario.

It should hardly be necessary to state that of the species listed below very few are available for general distribution throughout the country, and the planting of the various forms is largely confined to the particular areas in which they are indigenous.

- CATFISHES (SILURIDAE):
  - Catfish (*Leptops olivaris*).
  - Spotted channel catfish (*Ictalurus punctatus*).
  - Horned pout (*Ameiurus nebulosus*).
- CARP (CYPRINIDAE):
  - Common carp (*Cyprinus carpio*).
- BUFFALOFISH (CATOSTOMIDAE):
  - Common buffalo (*Ictiobus sp.*).
- SHAD and HERRING (CLUPEIDAE):
  - Shad (*Alosa sapidissima*).
- SALMONS, TROUTS, and WHITEFISHES (SALMONIDAE):
  - Common whitefish (*Coregonus clupeaformis*).
  - Lake herring, cisco (*Leucicthys sp.*).
  - Chinook, king or quinnat salmon (*Oncorhynchus tschawytscha*).
  - Chum salmon (*Oncorhynchus keta*).

- Salmons, Trouts, and Whitefishes—Continued.
  - Coho salmon, silver salmon (*Oncorhynchus kisutch*).
  - Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
  - Steelhead trout (*Salmo gairdneri*).
  - Atlantic salmon (*Salmo salar*).
  - Landlocked salmon (*Salmo sebago*).
  - Rainbow trout (*Salmo shasta*).
  - Black-spotted trout, redthroat trout (*Salmo lewisi*).
  - Brown or Loch Leven trout (*Salmo fario var.*).
  - Lake trout, Mackinaw trout (*Cristivomer namaycush*).
  - Brook trout (*Salvelinus fontinalis*).
- Grayling (Thymallidae):
  - Montana grayling (*Thymallus montanus*).
- Pikes (Esocidae):
  - Pike and pickerel (*Esox sp.*).
- Sunfishes (Centrarchidae):
  - Crappie (*Pomoxis annularis* and *P. sparoides*).
  - Largemouth black bass (*Micropterus salmoides*).
  - Smallmouth black bass (*Micropterus dolomieu*).
  - Rock bass (*Ambloplites rupestris*).
  - Warmouth bass, goggle-eye (*Chaenobryttus gulosus*).
  - Bluegill sunfish (*Lepomis incisor*).
  - Green sunfish (*Lepomis cyanellus*).
  - Redbreasted bream (*Lepomis auritus*).
  - Red-eared sunfish (*Lepomis heros*).
  - Common sunfish (*Lepomis gibbosus*).
  - Rio Grande perch (*Herichthys cyanoguttatus*).
- Perches (Percidae):
  - Pike perch (*Stizostedion vitreum*).
  - Yellow perch, ringed perch (*Perca flavescens*).
- White Basses (Serranidae):
  - White bass (*Roccus chrysops*).
- Drums (Sciaenidae):
  - Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).
- Cods (Gadidae):
  - Cod (*Gadus callarias*).
  - Haddock (*Melanogrammus aeglefinus*).
  - Pollock (*Pollachius virens*).
- Flounders (Pleuronectidae):
  - Winter flounder, American flatfish.
- Mackerel (Scombridae):
  - Common mackerel (*Scomber scombrus*).

Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1936

Species	Eggs	Fry	Fingerlings	Total
Catfish			6, 673, 000	6, 673, 000
Buffalofish	142, 337, 000		1, 218, 255	143, 555, 255
Carp	60, 500, 000		3, 277, 600	63, 777, 600
Shad		12, 150, 000		12, 150, 000
Whitefish		38, 080, 000		38, 080, 000
Lake herring	400, 000	2, 740, 000		3, 140, 000
Chinook salmon		21, 240	53, 607, 860	53, 629, 100
Chum salmon		14, 139, 000	9, 070	14, 148, 070
Silver salmon	25, 000	344, 580	4, 990, 740	5, 360, 320
Sockeye salmon		11, 038, 000	6, 577, 500	17, 615, 500
Steelhead trout	600, 000		809, 000	1, 409, 000
Atlantic salmon	1, 000, 000		560, 000	1, 560, 000
Landlocked salmon		67, 500	709, 870	777, 370
Rainbow trout	2, 758, 000		12, 136, 400	14, 894, 400
Blackspotted trout	10, 227, 000		12, 003, 310	22, 230, 310
Loch Leven trout	7, 867, 000	1, 105, 000	4, 576, 360	13, 548, 360
Lake trout	80, 600	713, 460	113, 575	907, 635
Brook trout	4, 518, 000	836, 000	12, 938, 650	18, 292, 650
Grayling	350, 000	4, 897, 500	272, 700	5, 520, 200
Pike and pickerel			775, 150	775, 150
Crappie			16, 188, 250	16, 188, 250
Black bass, largemouth		622, 500	3, 641, 160	4, 263, 660
Black bass, smallmouth		1, 255, 000	270, 100	1, 525, 100
Rock bass			121, 680	121, 680

Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1936—Continued

Species	Eggs	Fry	Fingerlings	Total
Warmouth bass			53, 160	53, 160
Sunfish			17, 504, 300	17, 504, 300
Pike perch	504, 965, 000	9, 670, 000		514, 635, 000
Yellow perch	11, 605, 000	307, 958, 000	147, 000	319, 710, 000
Freshwater drum			3, 400	3, 400
White bass			17, 000	17, 000
Miscellaneous fishes			1, 416, 400	1, 416, 400
Mackerel		1, 334, 000		1, 334, 000
Cod	3, 416, 733, 000	261, 662, 000		3, 678, 395, 000
Haddock	419, 976, 000	9, 588, 000		429, 564, 000
Flatfish (flounder)	43, 854, 000	1, 435, 283, 000		1, 479, 137, 000
Pollock	793, 831, 000	475, 457, 700		1, 269, 288, 700
Total	5, 421, 626, 600	2, 588, 962, 480	160, 611, 490	8, 171, 200, 570

PRODUCTION

A jump of approximately 60 percent in the curve of hatchery production during one year must naturally be attributed to some specific circumstances or condition aside from increased efficiency. This increase for the fiscal year 1936 is in a large degree traceable to an expansion of the propagation of marine fishes of the New England coast. Four varieties, the cod, haddock, pollock and flatfish were handled in an aggregate exceeding 6,500,000,000, in comparison with 3,500,000,000 of the same species for the previous year. This work was augmented in response to the expressed desire of Congress, and also due to the fact that it is a form of by-product recovery which can be carried on at relatively small cost.

The planting of over 3,500,000,000 fertilized eggs of these species is accomplished by no more complicated procedure than the placing of spawn takers on commercial fishing vessels operating in inshore New England waters. The eggs returned to the spawning grounds by this means would otherwise be a total loss.

Far greater interest will lie in a study of the output of game fish included in the above totals. The 118,680,000 game and pan fish is approximately 4,000,000 more than were produced last year and is 1.5 percent of the total output. The cost of producing this 1.5 percent, however, is approximately the same as the expense of propagating the remaining 98.5 percent. This is largely due to the fact that the majority of game fish are distributed as fingerlings or larger. One hundred and sixty million fingerlings, 27,000,000 more than last year, went to replenish our fishing waters. The significance of this is that this number of fish will have a much greater chance of surviving the hazards of predators and adverse natural conditions than would a greatly increased number of fry.

Conditions will not permit the Bureau to distribute its game fish at the legal catchable size, as is done by a number of the States, but the trend is constantly toward that end. Since it requires from 3 to 5 pounds of fish food, plus constant and assiduous care for a period of a year or more to produce 1 pound of trout, it will be seen that there are valid reasons why the foregoing objective is not realized 100 percent.

CONSTRUCTION ACTIVITIES

The physical condition of the 80 odd properties used for fish cultural work has an important bearing upon the production of fish. The year's activities involved a normal amount of upkeep and maintenance work as well as new construction to augment production facilities. New construction during the year has been mainly confined to three Works Progress Administration projects involving the erection of new fish cultural stations at Uvalde, Tex., Santa Rosa, N. Mex., and Smokemont, N. C., in the Great Smoky Mountain National Park. Active construction was initiated in November and the New Mexico project completed by the close of the fiscal year. In North Carolina the new hatchery was placed on a producing basis but was not fully completed. In Texas the work progressed favorably but considerable remained to be done at the end of the year. In addition the Bureau supervised the construction of hatchery facilities by certain other agencies, the details of which appear elsewhere in this report.

Beyond this, local W. P. A. agencies sponsored projects comprising the enlargement and improvement of several of the Bureau's hatcheries, including those at Rochester, Ind., Natchitoches, La., Lake Mills, Wis., Hagerman, Idaho, and the Upper Mississippi Wild Life and Fish Refuge. Development work also continued at the York Pond, N. H., brook trout station, labor and materials being secured from the Emergency Conservation organization and the W. P. A. C. C. C. workers also effected minor improvements at the Lamar, Pa., hatchery and small details of enrollees were used at several of the western hatcheries. No major items of improvement were effected from the Bureau's regular operating appropriations since it was necessary to devote these funds to the production of fish.

There was placed in operation a new hatchery at Harrison Lake, Va., 26 miles southeast of Richmond. The major portion of the construction on this project had been carried on during the previous fiscal year.

COOPERATION WITH OTHER CONSERVATION AGENCIES

An attempt to show graphically the interrelationship of the Federal hatchery system with other agencies concerned with the conservation of fish life would present a most complicated structure. There are multitudes of contacts throughout the country whereby the propagation and distribution of fish can be handled virtually as a joint enterprise between the Federal Government and the States. In some cases these are based upon specifically formulated agreements, as in the instance of the United States Forest Service and the States of New Hampshire and Vermont. In others they are merely an operating procedure resulting from informal understandings worked out in the field. As an instance of the latter, reference can be made to work in the Rocky Mountain and Pacific coast territory, where the collection of eggs from wild trout is supported by several of the States, who participate in a division of the resulting take. Elsewhere the Bureau's hatcheries are being used to rear game fish and the States contribute to the purchase of fish food.

Another form of valuable coordination lies in the distribution of the Federal hatchery output by the State conservation departments, as is done in Indiana, Georgia, Virginia, and a number of other States. Where Federal and State hatcheries are in juxtaposition it has been possible to concentrate the work in one or the other, or so to divide it as to eliminate any possibility of duplication.

Mention must also be made of the now general practice of submitting Federal fish applications to the State fishery authorities for their review and approval before deliveries are made. This accomplishes two purposes; first, it prevents the planting of species which might be inimical to whatever stocking policy the State may have developed; second, it makes possible the utilization of the available supply of fish, both State and Federal, to cover the greatest possible territory, and prevents the overstocking of certain waters while others lack needed attention.

So important is the maintenance of working contact with the States that the Division has assigned an employee on full time to act as liaison agent and to work out and maintain these cooperative relationships on a smooth working basis.

As previously, the U. S. Forest Service and the National Park Service have been important beneficiaries of the Bureau's fish cultural work. Probably the most important single phase of the propagation of game fish is the stocking of the public domain principally under the jurisdiction of the above agencies. The other Bureaus and Departments having control of land areas, as for example the Indian Service and the Reclamation Service, must likewise largely depend upon the Federal hatcheries to maintain a supply of fish in the water areas which they administer.

It is most interesting to point out that the newer Governmental agencies are likewise entering the picture under similar conditions. Both the Resettlement Administration and the Tennessee Valley Authority constructed fish hatcheries, which were turned over to the Bureau at the close of the fiscal year for future operation. The former agency developed an excellent hatchery at Hoffman, N. C., as part of a demonstration of land utilization, while the T. V. A. took the first step toward the maintenance of fishing in Norris Lake by constructing a warm-water hatchery below Norris Dam. Tentative plans for further development along this line are in mind.

It is felt that the propagation and distribution of fish, as well as other matters directly related to the administration of fisheries upon Government owned lands, should properly be a responsibility of this Bureau as the agency having the organization, facilities, and the knowledge required.

The maintenance of the closest possible contact with sportsmen's organizations of a semi-public character has not been overlooked. The system of fish nurseries or rearing ponds inaugurated a number of years ago has been continued but no intensive drive is being made to expand this work. Most of the States are now in a position to work more closely with the sportsmen's clubs in their territory in prosecuting such an activity. However, where conditions permit the Bureau has placed its technical information at the disposal of such organizations, this being exemplified in a general program for the establishment of local fish rearing units in the Finger Lakes region in New York. The sportsmen's clubs enlisted the services of the Bureau in laying out a general program for the establishment of the nursery and thereupon presented the matter to the county authorities with the request that they act as sponsors in submitting a W. P. A. project for the construction of the required facilities. While this project had not been brought to fruition at the close of the year, progress was being made in one of the most ambitious programs of this nature yet undertaken.

The Division further feels that it can be of great service to the sportsmen in supplying the technical information, showing them what they

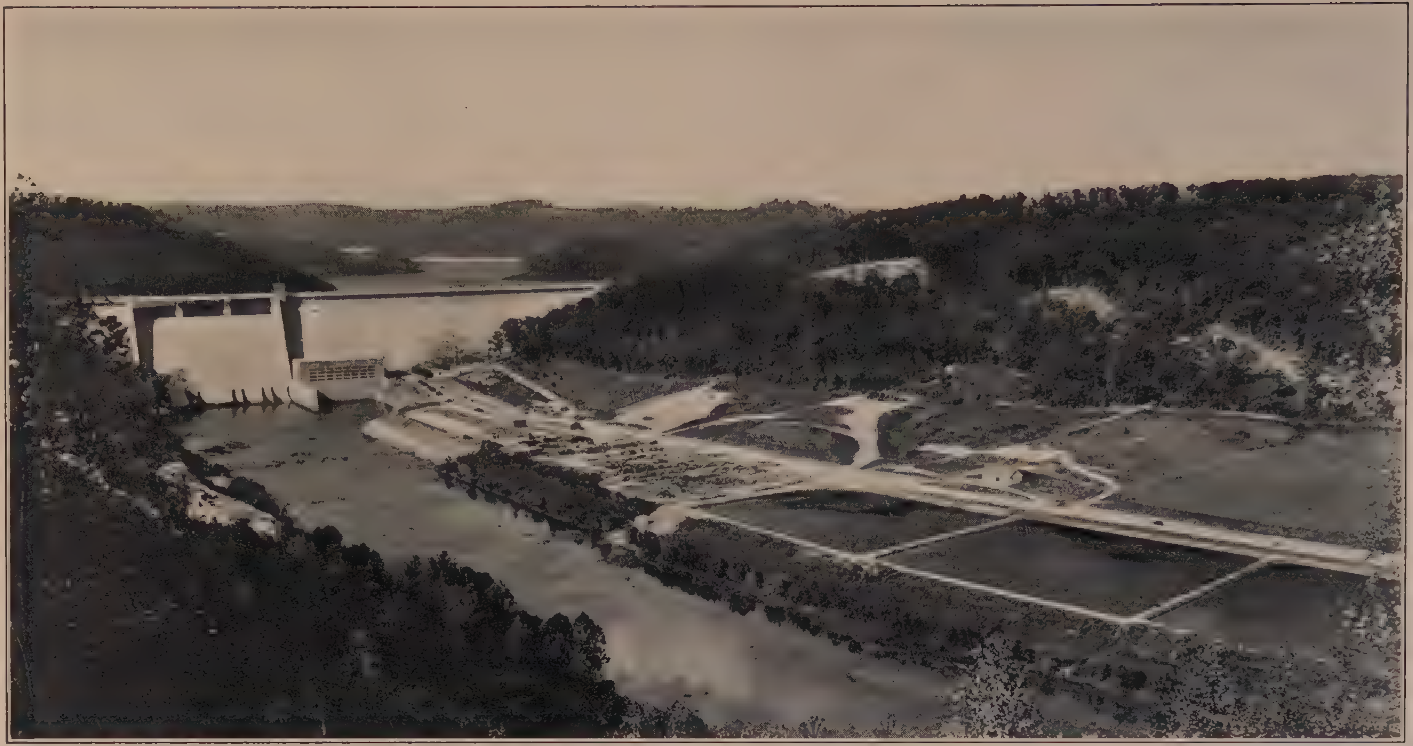

FIGURE 1.—HATCHING PONDS BELOW NORRIS DAM, TENN.

Hatchery constructed by Tennessee Valley Authority for operation by Bureau of Fisheries.

can or cannot do in the way of increasing the supply of fish in their strictly local waters.

In summary, there are three institutions engaged in propagating fish for public benefit; namely, the Federal Government, the States, and semi-public clubs. From a practical standpoint they might well be considered as parts of the same organization and the ultimate objective sought is that the work be carried on as if this situation actually prevailed.

SALVAGE OPERATIONS

The Upper Mississippi Wild Life and Fish Refuge was again the scene of the activities of seining crews salvaging stranded fish from land-locked pools stretching several hundred miles along the river. While the entire territory included in the refuge could not be fully covered by the crews, a total of 43,500,000 fish was saved from the sure death of receding waters and transferred to the main river or distributed to other waters. The latter disposal accounted for only a small fraction of the total number handled. Slightly over 850,000 were utilized for the filling of applications away from the river.

A strong demand has been built up in the Middle West for these fish since they are of large fingerling size when seined and are highly valuable for stocking. The Bureau has not been able to accede to this demand because it is felt that diversion of the fish to distant points would be an unjustifiable drain upon the resources of the Refuge. The future shipments from this source will be even less for the reason that the development of the 9 foot channel up to the Twin Cities is automatically going to make salvage work unnecessary and impossible. Already the progress of construction has limited salvage operations and within a year or two the rescue work will be largely a thing of the past. In lieu of this the Bureau is establishing large propagating ponds at various points within the refuge for the production of fish for distribution. Means will have to be devised to augment the area of these ponds if the demands are to be met in the future.

Number and disposition of fish rescued, fiscal year 1936

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish
All stations:			
Black bass	188, 140	141, 695	329, 835
Buffalofish		1, 218, 125	1, 218, 125
Carp		3, 267, 600	3, 267, 600
Catfish	49, 875	6, 207, 820	6, 257, 695
Crappie	259, 375	15, 706, 655	15, 966, 030
Drum		3, 290	3, 290
Pike-Pickerel	1, 900	773, 252	775, 152
Sunfish	347, 660	13, 506, 880	13, 854, 540
White bass		17, 000	17, 000
Yellow perch	4, 626	116, 078	120, 704
Miscellaneous Fishes		1, 709, 400	1, 709, 400
Total	851, 576	42, 667, 795	43, 519, 371
Summary by stations:			
Fairport	292, 145	992, 810	1, 284, 955
La Crosse	20, 165	3, 501, 956	3, 522, 121
Lynxville	23, 240	7, 564, 950	7, 588, 190
Bellevue	98, 480	5, 617, 270	5, 715, 750
Homer	251, 291	3, 117, 834	3, 369, 125
Marquette	166, 255	21, 872, 975	22, 039, 230
Total	851, 576	42, 667, 795	43, 519, 371

ASSIGNMENTS OF FISH AND FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

Thirty-two States have included in their output fish which wer derived directly or indirectly from Federal hatchery operations. I fact 639,000,000 eggs, fry, and fingerlings comprised the total o assignments to the State Fish and Game Departments. The bulk o these were eggs since these constituted raw material which can b most easily handled in transit. It should be pointed out that thi does not all represent "Federal aid" or donations but in many instance the assignments are the result of cooperative arrangements unde which the States stand their full share of the cost of producing th fish or eggs which they receive.

There has been a constant increase in the totals covered by thes cooperative relationships. The following list shows no shipment made to foreign countries. There was, however, a routine exchang of eggs with the Dominion of Canada. This is an annual arrangement whereby the Bureau obtains Atlantic salmon eggs as compensation for assignment of cut-throat trout eggs. It will also be noted that a shipment of rainbow trout eggs was made to Puerto Rico in continuation of the program of the insular Government to establish this game species in the mountainous sections of the Island.

The services of the Assistant Chief of the Division of Fish Culture were loaned to make a survey of Lake Titicaca, South America, for the Peruvian and Bolivian Governments. No shipments of fish have as yet been made as a consequence of this study, however.

Assignments of fish and fish eggs to State fish commissions, fiscal year 1936

States and species	Eggs	Fry	Fingerlings et cetera	Totals
Arizona:				
Blackspotted trout	750,000			750,000
Brook trout	302,000			302,000
Arkansas:				
Black bass, smallmouth		100,000		100,000
Colorado:				
Lake trout	25,620			25,620
Loch Leven trout	600,160			600,160
Connecticut:				
Black bass, smallmouth		409,000		409,000
Lake trout	25,000			25,000
Loch Leven trout	100,500			100,500
Rainbow trout	100,000			100,000
Georgia:				
Black bass, largemouth			48,795	48,795
Black bass, smallmouth		80,000		80,000
Catfish			3,045	3,045
Sunfish			324,150	324,150
Rainbow trout	301,600			301,600
Idaho:				
Blackspotted trout			182,000	182,000
Brook trout	102,500		17,500	120,000
Loch Leven trout			52,000	52,000
Rainbow trout	500,160		975,000	1,475,160
Steelhead salmon			46,500	46,500
Illinois:				
Black bass, largemouth			13,500	13,500
Catfish			12,000	12,000
Crappie			10,000	10,000
Sunfish			20,000	20,000
Indiana:				
Brook trout	154,800			154,800
Loch Leven trout	180,600			180,600
Rainbow trout	42,600			42,600
Black bass			51,125	51,125
Catfish			9,200	9,200
Rock bass			4,000	4,000
Sunfish			178,600	178,600
Yellow perch			4,000	4,000

Assignments of fish and fish eggs to State fish commissions, fiscal year 1936—Con.

States and species	Eggs	Fry	Fingerlings et cetera	Totals
Iowa:				
Black bass, largemouth			10, 000	10, 000
Crappie			15, 000	15, 000
Sunfish			13, 500	13, 500
Brook trout	5, 000			5, 000
Loch Leven trout	101, 000			101, 000
Rainbow trout	40, 000			40, 000
Maine:				
Atlantic salmon	1, 000, 000			1, 000, 000
Maryland:				
Rainbow trout	75, 000			75, 000
Massachusetts:				
Loch Leven trout	100, 500			100, 500
Rainbow trout	100, 000			100, 000
Michigan:				
Brook trout	508, 000		11, 735	519, 735
Rainbow trout			4, 000	4, 000
Minnesota:				
Black bass, largemouth			16, 500	16, 500
Lake trout			11, 000	11, 000
Montana:				
Loch Leven trout	2, 000, 000			2, 000, 000
Black bass, largemouth			25, 830	25, 830
Catfish			6, 000	6, 000
Crappie			3, 500	3, 500
Sunfish			25, 500	25, 500
Yellow perch			18, 700	18, 700
Nebraska:				
Brook trout			3, 500	3, 500
Loch Leven trout			15, 500	15, 500
Rainbow trout	57, 000			57, 000
New Hampshire:				
Brook trout	500, 000	433, 500	8, 900	942, 400
New Mexico:				
Black bass			201, 000	201, 000
Catfish			17, 300	17, 300
Crappie			5, 000	5, 000
Sunfish			56, 000	56, 000
North Carolina:				
Brook trout			28, 000	28, 000
Loch Leven trout	361, 500			361, 500
Rainbow trout	101, 000		135, 200	236, 200
North Dakota:				
Black bass			7, 720	7, 720
Crappie			7, 000	7, 000
Sunfish			16, 000	16, 000
Ohio:				
Pike perch	548, 480, 000			548, 480, 000
Rainbow trout			30, 000	30, 000
Whitefish		32, 680, 000		32, 680, 000
Oregon:				
Blackspotted trout			97, 800	97, 800
Chinook salmon	15, 490, 000			15, 490, 000
Rainbow trout			260, 580	260, 580
Silver salmon			9, 600	9, 600
Steelhead trout	600, 000			600, 000
South Carolina:				
Black bass		11, 500		11, 500
Loch Leven trout	50, 500			50, 500
Rainbow trout			17, 000	17, 000
South Dakota:				
Loch Leven trout	206, 500			206, 500
Tennessee:				
Loch Leven trout	103, 700		60, 000	163, 700
Rainbow trout	550, 000		110, 000	660, 000
Sunfish			2, 500	2, 500
Utah:				
Brook trout			81, 000	81, 000
Grayling	125, 000			125, 000
Rainbow trout			75, 000	75, 000
Vermont:				
Brook trout	500, 000	384, 680	62, 000	946, 680
Landlocked salmon		67, 000	46, 000	113, 000
Pike perch	11, 605, 000			11, 605, 000
Yellow perch	11, 050, 000			11, 050, 000
Virginia:				
Brook trout	760, 000		25, 000	785, 000
Rainbow trout			150, 340	150, 340
Washington:				
Blackspotted trout			5, 000	5, 000
Grayling			125, 000	125, 000
Rainbow trout			543, 600	543, 600

Assignments of fish and fish eggs to State fish commissions, fiscal year 1936—Con.

States and species	Eggs	Fry	Fingerlings et cetera	Totals
West Virginia:				
Brook trout	750, 000		213, 050	963, 050
Loch Leven trout	501, 000		388, 500	889, 500
Rainbow trout			541, 000	541, 000
Wisconsin:				
Black bass			28, 350	28, 350
Crappie			17, 300	17, 300
Loch Leven trout			28, 250	28, 250
Sunfish			16, 700	16, 700
Wyoming:				
Brook trout			27, 000	27, 000
Loch Leven trout	680, 300			680, 300
Total	599, 586, 540	34, 165, 680	5, 574, 370	639, 326, 590

Assignments of fish and fish eggs to territories, fiscal year 1936

Territory and species	Eggs
Puerto Rico: Rainbow trout	100, 000

TRANSFER OF EGGS BETWEEN STATIONS

There is a great difference in the efficiency of hatcheries due to varying local conditions. At certain points brood stock can be reared most economically for egg production and these hatcheries are used as sources of general supply for trout eggs for the entire Bureau. The accompanying table showing the transfer of eggs between stations will illustrate the extent of this practice. In some instances, as in the case of the Creede, Colo., and Ennis, Mont., stations, the eggs are collected from wild or semi-wild fish. This procedure has made it possible to secure a stock of eggs from the Bureau's own resources without the necessity of purchasing any from commercial sources.

Transfer of eggs between stations, fiscal year 1936

Species	Number of eggs	From—	To—
Black-spotted trout	150, 420	Saratoga, Wyo	Bozeman, Mont.
	150, 300	do	Springville, Utah.
	481, 700	Yellowstone Park, Wyo	Bozeman, Mont.
	704, 000	do	Birdsview, Wash.
	250, 000	do	Clackamas, Oreg.
	350, 000	do	Crawford, Nebr.
	1, 500, 000	do	Jackson Hole, Wyo.
	500, 000	do	Hagerman, Idaho.
	1, 325, 000	do	Leadville, Colo.
	700, 000	do	Quinault, Wash.
	200, 000	do	Saratoga, Wyo.
	75, 000	do	Spearfish, S. D.
	2, 150, 000	do	Springville, Utah.
Brook trout	150, 000	Berkshire, Mass	Nashua, N. H.
	45, 000	Craig Brook, Maine	Duluth, Minn.
	200, 000	do	La Crosse, Wis.
	100, 000	do	Manchester, Iowa.
	570, 000	do	Nashua, N. H.
	200, 000	do	Northville, Mich.
	200, 000	do	Ogletown, Pa.
	400, 000	do	White Sulphur Springs, W. Va.
	600, 000	do	Wytheville, Va.
	251, 000	Leadville, Colo	Crawford, Nebr.
	104, 000	do	Creede, Colo.
	202, 000	do	La Crosse, Wis.
	102, 000	do	Hagerman, Idaho.
	405, 000	do	Saratoga, Wyo.

Transfer of eggs between stations, fiscal year 1936—Continued

Species	Number of eggs	From—	To—
Brook trout	355,000	Leadville, Colo	Spearfish, S. D.
	400,000	do	Springville, Utah.
	300,550	Creede, Colo	Bozeman, Mont.
	508,475	do	Duluth, Minn.
	150,750	do	La Crosse, Wis.
	100,400	do	Lake Mills, Wis.
	100,430	do	Manchester, Iowa.
	502,460	do	Northville, Mich.
	250,000	do	Spearfish, S. D.
	602,250	do	Springville, Utah.
	100,000	do	Clackamas, Oreg.
	100,535	Pittsford, Vt	Cape Vincent, N. Y.
	50,000	do	Leetown, W. Va.
	262,450	do	Berlin, N. H.
	200,000	York Pond, N. H	Barneveld, N. Y.
	795,000	do	Cape Vincent, N. Y.
	450,000	do	Cortland, N. Y.
	450,000	do	Erwin, Tenn.
	308,000	do	St. Johnsbury, Vt.
	650,000	do	White Sulphur Springs, W. Va.
Brook trout	107,100	Saratoga, Wyo	Jackson Hole, Wyo.
Grayling	500,000	Yellowstone Park, Wyo	Bozeman, Mont.
	100,000	do	Spearfish, S. Dak.
	357,000	do	Spokane, Wash.
	500,000	do	Springville, Utah.
Lake trout	30,000	Cape Vincent, N. Y	Cortland, N. Y.
Landlocked salmon	20,000	Craig Brook, Maine	Nashua, N. H.
Lock Leven trout	100,580	Bozeman, Mont	Cape Vincent, N. Y.
	487,200	do	Clackamas, Oreg.
	172,800	do	Crawford, Nebr.
	151,340	do	Duluth, Minn.
	50,500	do	Erwin, Tenn.
	273,680	do	Hagerman, Idaho.
	332,440	do	La Crosse, Wis.
	151,200	do	Lake Mills, Wis.
	100,700	do	Leetown, W. Va.
	356,400	do	Manchester, Iowa.
	50,500	do	Ogletown, Pa.
	100,500	do	Rochester, N. Y.
	384,600	do	Saratoga, Wyo.
	356,400	do	Spearfish, S. Dak.
	610,440	do	Springville, Utah.
	251,500	do	White Sulphur Spr., W. Va.
Rainbow trout	100,320	do	Butte Falls, Oreg.
	250,400	do	Glacier Park, Mont.
	1,416,000	do	Meadow Creek, Mont.
	201,600	do	Quinault, Wash.
	361,600	do	Spearfish, S. Dak.
	150,320	do	Spokane, Wash.
	362,900	Manchester, Iowa	Bozeman, Mont.
	331,100	do	Crawford, Nebr.
	153,100	do	Duluth, Minn.
	303,000	do	La Crosse, Wis.
	76,000	do	Lake Mills, Wis.
	305,600	do	Northville, Mich.
	15,000	Neosho, Mo	Aquarium, Wash., D. C.
	310,000	do	Bozeman, Mont.
	102,000	do	Butte Falls, Oreg.
	97,000	do	Crawford, Nebr.
	80,000	do	Ogletown, Pa.
	612,000	do	Saratoga, Wyo.
	166,780	Springville, Utah	Birdsview, Wash.
	350,550	do	Hagerman, Idaho.
	100,640	do	Quinault, Wash.
	100,000	White Sulphur Springs, W. Va.	Ogletown, Pa.
	25,000	Wytheville, Va	Aquarium, Wash., D. C.
	100,000	do	Barneveld, N. Y.
	75,000	do	Rochester, N. Y.
Silver salmon	70,000	Birdsview, Wash	Leetown, W. Va.

STATION OUTPUT

The following summary indicates the location of the producing units and the number and species which each has contributed to the replenishment of the lakes and streams of the country. Forty-three main stations and 38 substations are listed, representing an increase of 4 substations over the summary for last year. This increase arises from the placing in operation of new projects at Spokane, Wash., San Angelo, Tex., Harrison Lake, Va., and the reestablishment of limited operations at the Swanton, Vt., station previously closed. While each of these hatcheries is primarily intended for the restocking of waters in its own contiguous area, the output of any of them may nevertheless reach 2 or 3 different States. The designation as main station or substation is not necessarily due to the size of the establishment or the magnitude of output but is a more or less arbitrary separation for administrative purposes.

It appears advisable to repeat the statement in previous reports that all carp shown in the list are replanted directly in commercial fishing waters, from which the eggs are secured and in which this species is now well established. No carp are planted except under the foregoing conditions.

Stations and substations operated and the output of each, fiscal year 1936

Stations, substations, and species	Eggs	Fry	Fingerlings	Totals
Baird, Calif.:				
Chinook salmon			5, 260	5, 260
Battle Creek, Calif.:				
Chinook salmon			5, 055, 410	5, 055, 410
Mill Creek, Calif.:				
Chinook salmon		1, 620, 000	3, 141, 735	4, 761, 735
Birdsview, Wash.:				
Blackspotted trout			352, 000	352, 000
Chinook salmon			136, 000	136, 000
Silver salmon	25, 000		2, 762, 000	2, 787, 000
Sockeye salmon			269, 500	269, 500
Steelhead trout			289, 000	289, 000
Baker Lake, Wash.:				
Blackspotted trout			48, 700	48, 700
Mt. Rainier, Wash.:				
Blackspotted trout			188, 900	188, 900
Brook trout			308, 445	308, 445
Rainbow trout			292, 400	292, 400
Steelhead trout			17, 600	17, 600
Spokane, Wash.:				
Blackspotted trout			21, 750	21, 750
Grayling			250, 000	250, 000
Rainbow trout			266, 620	266, 620
Berkshire Trout Hatchery, Mass.:				
Brook trout			114, 630	114, 630
Catfish			1, 525	1, 525
Black bass, smallmouth		840, 000		840, 000
Boothbay Harbor, Maine:				
Cod	953, 619, 000			953, 619, 000
Flounder		1, 015, 200, 000		1, 015, 200, 000
Haddock	135, 094, 000			135, 094, 000
Bozeman, Mont.:				
Blackspotted trout			1, 814, 150	1, 814, 150
Brook trout			276, 135	276, 135
Loch Leven trout	6, 134, 660			6, 134, 660
Rainbow trout			744, 815	744, 815
Ennis, Mont.:				
Blackspotted trout			236, 370	236, 370
Loch Leven trout	1, 460, 000	1, 105, 000	1, 285, 130	3, 850, 130
Rainbow trout			700, 205	700, 205
Miles City, Mont.:				
Black bass, largemouth			93, 030	93, 030
Catfish			12, 100	12, 100
Crappie			46, 660	46, 660
Sunfish			72, 635	72, 635
Yellow perch			18, 720	18, 720
Cape Vincent, N. Y.:				
Brook trout			1, 500	1, 500
Lake herring	400, 000	2, 740, 000		3, 140, 000
Lake trout	35, 000	493, 000	2, 700	530, 700
Loch Leven trout	35, 000			35, 000
Black bass, smallmouth			49, 900	49, 900
Whitefish		3, 125, 000		3, 125, 000
Barneveld, N. Y.:				
Brook trout			66, 900	66, 900
Loch Leven trout			16, 500	16, 500
Rainbow trout			7, 950	7, 950

tations and substations operated and the output of each, fiscal year 1936—Contd.

Stations, substations, and species	Eggs	Fry	Fingerlings	Totals
ape Vincent, N. Y.—Continued.				
Cortland, N. Y.:				
Brook trout			135, 770	135, 770
Swanton, Vt.:				
Pike perch	11, 605, 000			11, 605, 000
Yellow perch	11, 050, 000			11, 050, 000
Rochester, N. Y.:				
Black bass, largemouth			3, 000	3, 000
Brook trout			4, 160	4, 160
Loch Leven trout			75, 570	75, 570
Smallmouth bass			14, 500	14, 500
Rainbow trout			80, 920	80, 920
Watertown, N. Y.:				
Brook trout			104, 015	104, 015
Lake trout		27, 960	46, 875	74, 835
Loch Leven trout			77, 250	77, 250
Rainbow trout			1, 460	1, 460
lackamas, Oreg.:				
Blackspotted trout			97, 800	97, 800
Brook trout	50, 000		98, 900	148, 900
Chinook salmon			5, 242, 000	5, 242, 000
Loch Leven trout	78, 000			78, 000
Rainbow trout	50, 000		214, 580	264, 580
Silver salmon			33, 480	33, 480
Big White Salmon, Wash.:				
Chinock salmon	4, 484, 000		10, 161, 225	14, 645, 225
Butte Falls, Oreg.:				
Blackspotted trout			125, 000	125, 000
Chinook salmon			18, 297, 680	18, 297, 680
Silver salmon			674, 600	674, 600
Steelhead trout	600, 000		302, 900	902, 900
Little White Salmon, Wash.:				
Chinook salmon	21, 960, 000		11, 584, 335	33, 544, 335
raig Brook, Maine:				
Atlantic salmon	1, 000, 000		568, 000	1, 568, 000
Brook trout			460, 800	460, 800
Landlocked salmon			394, 500	394, 500
Smelt	5, 000, 000			5, 000, 000
rawford, Nebr.:				
Black bass, largemouth			82, 340	82, 340
Blackspotted trout			333, 565	333, 565
Brook trout			358, 850	358, 850
Catfish			226, 300	226, 300
Crappie			64, 975	64, 975
Lock Leven trout			287, 600	287. 600
Rainbow trout			444, 860	444, 860
Rock bass			9, 100	9, 100
Sunfish			3, 600	3, 600
exter, N. Mex.:				
Black bass, largemouth			363, 310	363, 310
Catfish			21, 055	21, 055
Crappie			5, 750	5, 750
Sunfish			100, 585	100, 585
uluth, Minn.:				
Brook trout			226, 000	226, 000
Lake trout	25, 600	192, 500	64, 000	282, 100
Lock Leven trout			52, 000	52, 000
Pike perch		9, 670, 000		9, 670, 000
Rainbow trout			33, 000	33, 000
Whitefish		1, 275, 000		1, 275, 000
denton, N. C.:				
Black bass, largemouth		16, 200	15, 750	31, 950
Shad		2, 600, 000		2, 600, 000
Sunfish			23, 700	23, 700
Warmouth bass			175	175
Yellow perch			385	385
rwin, Tenn.:				
Black bass, largemouth		20, 000	2, 790	22, 790
Brook trout			100, 000	100, 000
Lock Leven trout			18, 500	18, 500
Rainbow trout			570, 275	570, 275
Rock bass			23, 400	23, 400
Sunfish			129, 175	129, 175
airport, Iowa:				
Black bass, largemouth		54, 500	95, 400	149, 900
Buffalofish	84, 212, 500		46, 525	84, 259, 025
Carp	1, 500, 000		158, 600	1, 658, 600
Catfish			451, 185	451, 185
Crappie			232, 760	232, 760
Drum			35	35
Sunfish			266, 825	266, 825
White bass			225	225
Yellow perch			1, 000	1, 000
Miscellaneous fishes			32, 400	32, 400

Stations and substations operated and the output of each, fiscal year 1936—Contd.

Stations, substations, and species	Eggs	Fry	Fingerlings	Totals
Flintville, Tenn.:				
Black bass, largemouth			4, 150	4, 150
Black bass, smallmouth			75	75
Crappie			50	50
Lock Leven trout			114, 000	114, 000
Rainbow trout			161, 000	161, 000
Rock bass			1, 200	1, 200
Sunfish			8, 925	8, 925
Fort Belvoir, Va.:				
Black bass, largemouth			1, 555	1, 555
Crappie			400	400
Shad		11, 850, 000		11, 850, 000
Sunfish			1, 225	1, 225
Yellow perch		307, 958, 000		307, 958, 000
Lakelands Ponds, Md.:				
Black bass, largemouth			100	100
Crappie			510	510
Yellow perch			2, 200	2, 200
Sunfish			72, 100	72, 100
Gloucester, Mass.:				
Cod	2, 463, 113, 000	262, 662, 000		2, 725, 775, 000
Flatfish	43, 854, 000	19, 512, 000		63, 366, 000
Haddock	284, 642, 000	95, 588, 000		380, 230, 000
Pollock	793, 831, 700	475, 457, 700		1, 269, 289, 400
Hagerman, Idaho:				
Blackspotted trout			58, 380	58, 380
Brook trout			46, 140	46, 140
Loch Leven trout			52, 000	52, 000
Rainbow trout			769, 100	769, 100
Salmon, Idaho:				
Blackspotted trout			93, 450	93, 450
Rainbow trout			659, 700	659, 700
Steelhead trout			46, 500	46, 500
La Crosse, Wis.:				
Black bass, largemouth			18, 000	18, 000
Brook trout			539, 200	539, 200
Buffalofish			92, 300	92, 300
Carp			483, 500	483, 500
Catfish			352, 200	352, 200
Crappie			1, 375, 000	1, 375, 000
Loch Leven trout			350, 900	350, 900
Pike-Pickerel			321, 800	321, 800
Rainbow trout			295, 600	295, 600
Sunfish			849, 800	849, 800
White bass			700	700
Yellow perch			19, 200	19, 200
Bellevue, Iowa:				
Black bass, largemouth			84, 500	84, 500
Buffalofish	68, 125, 000		257, 900	68, 382, 900
Carp	59, 000, 000		661, 000	59, 661, 000
Catfish			598, 500	598, 500
Crappie			1, 822, 875	1, 822, 875
Drum			1, 400	1, 400
Pike-Pickerel			2, 600	2, 600
Sunfish			1, 706, 250	1, 706, 250
White bass			6, 475	6, 475
Yellow perch			2, 650	2, 650
Miscellaneous fishes			556, 000	556, 000
Homer, Minn.:				
Black bass, largemouth			13, 700	13, 700
Buffalofish			100	100
Carp			12, 000	12, 000
Catfish			75, 800	75, 800
Crappie			1, 824, 700	1, 824, 700
Drum			1, 850	1, 850
Pike-Pickerel			404, 150	404, 150
Sunfish			522, 225	522, 225
White bass			2, 400	2, 400
Yellow perch			4, 200	4, 200
Miscellaneous fishes			508, 000	508, 000
Lake Mills, Wis.:				
Black bass, largemouth			13, 650	13, 650
Black bass, smallmouth			10, 165	10, 165
Brook trout			89, 500	89, 500
Crappie			1, 400	1, 400
Loch Leven trout			86, 000	86, 000
Rainbow trout			63, 850	63, 850
Rock bass			2, 300	2, 300
Sunfish			5, 575	5, 575
Lynxville, Wis.:				
Black bass, largemouth			13, 800	13. 800
Buffalofish			28, 500	28, 500
Carp			51, 500	51, 500
Catfish			207, 000	207, 000

Stations and substations operated and the output of each, fiscal year 1936—Contd.

Stations, substations, and species	Eggs	Fry	Fingerlings	Totals
La Crosse, Wis.—Continued.				
Lynxville, Wis.—Continued.				
Crappie			3, 040, 000	3, 040, 000
Pike-pickerel			4, 200	4, 200
Sunfish			1, 622, 440	1, 622, 440
White bass			3, 600	3, 600
Yellow perch			4, 150	4, 150
Miscellaneous fishes			603, 000	603, 000
Marquette, Iowa:				
Black bass, largemouth			56, 800	56, 800
Buffalofish			792, 800	792, 800
Carp			1, 901, 000	1, 901, 000
Catfish			4, 548, 000	4, 548, 000
Crappie			7, 670, 700	7, 670, 700
Pike-pickerel			42, 400	42, 400
Sunfish			6, 887, 000	6, 887, 000
White bass			3, 600	3, 600
Yellow perch			89, 300	89, 300
Rochester, Ind.				
Black bass, largemouth			83, 285	83, 285
Black bass, smallmouth			200	200
Catfish			11, 800	11, 800
Crappie			1, 825	1, 825
Rock bass			17, 950	17, 950
Sunfish			142, 830	142, 830
Yellow perch			5, 100	5, 100
Upper Mississippi River Ponds:				
Black bass, largemouth		128, 000	304, 775	432, 775
Black bass, smallmouth			1, 125	1, 125
Catfish			7, 010	7, 010
Crappie			20, 950	20, 950
Sunfish			37, 715	37, 715
Lake Park, Ga.:				
Black bass, largemouth			3, 055	3, 055
Catfish			6, 808	6, 880
Sunfish			226, 700	226, 700
Warm Springs, Ga.:				
Black bass, largemouth		11, 900	333, 625	345, 525
Catfish			1, 560	1, 560
Sunfish			458, 050	458, 050
Lamar, Pa.:				
Brook trout			97, 060	97, 060
Loch Leven trout			14, 150	14, 150
Rainbow trout			61, 500	61, 500
Leadville, Colo.:				
Blackspotted trout			581, 000	581, 000
Brook trout	1, 320, 000		2, 442, 000	3, 762, 000
Loch Leven trout	100, 000		158, 000	258, 000
Rainbow trout			729, 600	729, 600
Creede, Colo.:				
Blackspotted trout			427, 700	427, 700
Brook trout	1, 773, 700		1, 520, 250	3, 293, 950
Loch Leven trout			75, 020	75, 020
Rainbow trout			543, 550	543, 550
Eagles Nest, N. Mex.:				
Blackspotted trout			55, 000	55, 000
Brook trout			16, 000	16, 000
Loch Leven trout			70, 500	70, 500
Rainbow trout			249, 000	249, 000
Leetown, W. Va.:				
Black bass, largemouth			1, 355	1, 355
Black bass, smallmouth			29, 565	29, 565
Blackspotted trout			700	700
Brook trout			61, 375	61, 375
Loch Leven trout			29, 400	29, 400
Rainbow trout			138, 120	138, 120
Silver salmon			27, 000	27, 000
Sunfish			4, 600	4, 600
Louisville, Ky.:				
Black bass, largemouth			29, 200	29, 200
Black bass, smallmouth		250, 000	3, 950	253, 950
Crappie			150	150
Rock bass			4, 410	4, 410
Sunfish			2, 900	2, 900
Mammoth Spring, Ark.:				
Black bass, largemouth			174, 925	174, 925
Black bass, smallmouth		165, 000	100, 225	265, 225
Rock bass			25, 500	25, 500
Sunfish			81, 000	81, 000
Manchester, Iowa:				
Black bass, smallmouth			8, 930	8, 930
Brook trout	5, 000		167, 350	172, 350
Loch Leven trout	60, 000		232, 700	292, 700
Rainbow trout	151, 300		45, 170	196, 470
Rock bass			5, 300	5, 300

Stations and substations operated and the output of each, fiscal year 1936—Contd.

Stations, substations, and species	Eggs	Fry	Fingerlings	Totals
Marion, Ala.:				
Black bass, largemouth		18, 000	409, 500	427, 500
Sunfish			539, 160	539, 160
Tupelo, Miss.:				
Black bass, largemouth		89, 000	272, 500	361, 500
Sunfish			190, 025	190, 025
Nashua, N. H.:				
Black bass, smallmouth			1, 750	1, 750
Brook trout			180, 625	180, 625
Catfish			3, 275	3, 275
Landlocked salmon			19, 500	19, 500
Rainbow trout			4, 530	4, 530
National Forest of N. H. (Berlin, N. H.):				
Brook trout	1, 000, 000	242, 000	238, 140	1, 480, 140
St. Johnsbury, Vt.:				
Black bass, smallmouth			3, 150	3, 150
Brook trout		544, 500	226, 180	770, 680
Landlocked salmon		67, 500	59, 640	127, 140
Neosho, Mo.:				
Black bass, largemouth		170, 000	76, 930	246, 930
Crappie			3, 400	3, 400
Rainbow trout	308, 000		38, 670	346, 670
Rock bass			4, 925	4, 925
Sunfish			24, 550	24, 550
Natchitoches, La.:				
Black bass, largemouth			110, 875	110, 875
Sunfish			15, 365	15, 365
Warmouth bass			8, 400	8, 400
Tishomingo, Okla.:				
Black bass, largemouth			139, 555	139, 555
Catfish			18, 630	18, 630
Crappie			77, 205	77, 205
Sunfish			170, 910	170, 910
Warmouth bass			25, 700	25, 700
Northville, Mich.:				
Black bass, largemouth			6, 600	6, 600
Black bass, smallmouth			44, 000	44, 000
Brook trout			763. 185	763, 185
Rainbow trout			227, 500	227, 500
Sunfish			64, 300	64, 300
Orangeburg, S. C.:				
Black bass, largemouth		11, 500	355, 430	366, 930
Catfish			1, 720	1, 720
Crappie			2. 560	2, 560
Sunfish			160, 500	160, 500
Warmouth bass			18, 870	18, 870
Pittsford, Vt.:				
Blackspotted trout			7, 100	7, 100
Brook trout			57, 260	57, 260
Grayling			2. 185	2, 185
Rainbow trout			175, 470	175, 470
Put in Bay, Ohio:				
Pike perch	548, 480, 000			548, 480. 000
Whitefish		32, 680, 000		32, 680. 000
Quinault, Wash.:				
Blackspotted trout			367, 500	367, 500
Brook trout			217. 200	217. 200
Chinook salmon		21, 240	12. 510	33. 750
Sockeye salmon		11, 038, 000	3, 765. 000	14, 803, 000
Duckabush, Wash.:				
Chum salmon		7, 342, 000		7, 342, 000
Silver salmon		70, 700	92, 700	163. 400
Quilcene, Wash.:				
Blackspotted trout			366. 000	366, 000
Brook trout			198, 900	198. 900
Chum salmon		6, 797. 000	9, 070	6, 806. 070
Silver salmon		273, 800	464. 700	738. 500
Steelhead trout			153. 000	153, 000
San Marcos, Tex.:				
Black bass, largemouth		34, 000	151, 060	185, 060
Crappie			28, 980	28, 980
Sunfish			91, 430	91, 430
Ft. Worth, Tex.:				
Black bass, largemouth			44, 625	44, 625
Catfish			6, 050	6, 050
Crappie			13, 725	13, 725
Sunfish			19, 750	19, 750
San Angelo, Tex.:				
Black bass, largemouth			28, 065	28, 065
Crappie			13, 100	13, 100
Sunfish			4, 000	4, 000

Stations and substations operated and the output of each, fiscal year 1936—Contd.

Stations, substations, and species	Eggs	Fry	Fingerlings	Totals
Saratoga, Wyo.:				
Blackspotted trout			510,100	510,100
Brook trout			953,720	953,720
Loch Leven trout			558,100	558,100
Rainbow trout			372,770	372,770
Spearfish, S. Dak.:				
Boackspotted trout			85,320	85,320
Brook trout			847,000	847,000
Grayling		90,000		90,000
Loch Leven trout			236,700	236,700
Rainbow trout			630,450	630,450
Springville, Utah:				
Blackbass, largemouth			2,515	2,515
Blackspotted trout			470,300	470,300
Brook trout			288,000	288,000
Golden trout			11,100	11,100
Grayling	125,000		22,700	147,700
Loch Leven trout			334,000	334,000
Rainbow trout	500,160		705,080	1,205,240
Sunfish			15,500	15,500
Bear Lake, Utah:				
Brook trout			404,600	404,600
Rainbow trout			67,100	67,100
Silver salmon			124,100	124,100
White Sulphur Springs, W. Va.:				
Black bass, largemouth			350	350
Brook trout			675,530	675,530
Loch Leven trout			383,450	383,450
Rainbow trout	405,000		1,329,700	1,734,700
Rock bass			3,300	3,300
Sunfish			87,730	87,730
Woods Hole, Mass.:				
Flatfish		400,571,000		400,571,000
Mackerel		1,234,000		1,234,000
Wytheville, Va.:				
Black bass, largemouth			2,410	2,410
Black bass, smallmouth			3,560	3,560
Brook trout			335,530	335,530
Rainbow trout	1,550,000		743,500	2,293,500
Rock bass			23,620	23,620
Sunfish			54,900	54,900
Harrison Lake, Va.:				
Black bass, largemouth		86,000	10,200	96,200
Yellowstone Park, Wyo.:				
Blackspotted trout	9,696,000		5,280,000	14,976.000
Grayling	225,000	4,810,500		5,035,500
Moose, Wyo.:				
Blackspotted trout		43,500	530,420	573,920
Brook trout			63,150	63,150

EGG COLLECTIONS

As might be expected the increase in the collection of eggs was roughly proportional to the augmented output of the species which are incubated artificially. The Bureau's egg supply is obtainable from three sources: Trout eggs are obtained from a brood stock maintained at the hatcheries or by collections from wild fish captured during their spawning migrations. The second source, and the greatest numerically, is the activities of the commercial fishermen, which yields eggs of such varieties as shad, cod, haddock, whitefish, pike perch, and lake trout. The eggs of the Pacific salmon are obtained in still a different manner, being taken by the Bureau's employees as the fish approach the spawning grounds after having eluded the nets and traps of the commercial fishermen. Many of the eggs, therefore, are in the nature of a byproduct.

Comparison of egg collections, fiscal years 1935 and 1936

Species	1935	1936	Species	1935	1936
Shad	5,280,000	22,128,000	Pike perch	519,075,000	536,845,000
Whitefish	54,895,000	59,970,000	Yellow perch	14,000,000	324,166,000
Chinook salmon	29,919,000	75,282,000	White perch	2,400,000	----------------
Chum salmon	21,138,000	19,703,000	Cod	1,753,129,000	3,956,886,000
Silver salmon	3,398,000	4,487,000	Haddock	264,483,000	430,109,000
Sockeye salmon	3,326,000	16,262,000	Pollock	523,622,000	1,462,985,000
Steelhead trout	1,352,000	2,547,000	Flounder	1,375,129,000	1,634,507,000
Rainbow trout	21,365,920	24,154,000	Mackerel	2,800,000	1,796,000
			Lake herring	5,520,000	6,760,000
Blackspotted trout	21,206,000	40,879,000	Carp	83,250,000	1,500,000
Lock Leven trout	30,372,000	15,757,000	Buffalofish	214,046,000	13,912,000
Lake trout	2,684,000	1,578,500			
Brook trout	29,265,500	27,128,800	Total	4,981,655,420	8,683,260,500
Grayling	----------------	3,918,000			

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmon.—Headquarters for the work in both the Pacific Coast States and the Rocky Mountain section were transferred to Seattle, Wash., at the start of the fiscal year. The propagation of the Pacific salmons yielded much better results than during the previous year. A noticeable increase in the two most valuable species, the chinook salmon and the sockeye salmon, was registered. No pink salmon were propagated and the chum variety was handled in smaller numbers.

The augmented output of chinook salmon was due to a record run of fish at the Big and Little White Salmon, Wash., substations. Collections were made to the full capacity of these establishments and enough fish were available to yield a collection of approximately 45,000,000 eggs. It is particularly important to increase the production of this variety, due to the changes which will occur in the Columbia River following the completion of the Bonneville Dam. In fact, these two stations will be partly flooded when the dam is completed and plans are being made for their relocation at other points where the work can be continued with the same efficiency and trout may be handled in addition.

The facilities of the main station at Clackamas, Oreg., were improved by the action of the State of Oregon in transferring to the Bureau the hatchery property located at Delph Creek, a few miles away. This will be used to rear trout and salmon during the summer months when the water supply at the station is inadequate. The fish cultural work at Clackamas proceeded along normal lines otherwise. The station is constantly increasing its production of game trout, however.

In the California field no effort was made to collect eggs at the Baird station due to the uncertain results and the cost involved. A million and a half chinook salmon eggs were transferred for incubation from the Battle Creek substation. Total collections at that point amounted to 8,500,000, approximating a normal take under existing conditions. At the Mill Creek substation egg collections amounted to 4,500,000.

In the Olympic Peninsula the output of sockeye from the Quinault, Wash., station again resumed normal proportions, approximating 13,000,000. Some new rearing ponds were constructed by E. C. W.

labor. Here, too, the output of trout was increased in conformity with the program of augmenting the production of game fish at these salmon hatcheries.

The two substations located at Duckabush and Quilcene, Wash., concentrated on the propagation of chum salmon. A large number of these eggs are easily obtainable and are incubated at both stations. The most important factor here was the construction of a fish food dehydrating plant at Quilcene. This is used in preparing fish meal from the spawned-out chum salmon, and a considerable quantity of this material was turned out at a cost of approximately 4½ cents per pound. The salmon propagation is likewise being supplemented by concentrating on the production of game trout during the summer months.

At the Birdsview, Wash., station, the total egg collections were almost four times as great as during the previous year. Almost a million trout eggs of various species were incubated. However, the run of steelhead was noticeably below the level of previous years. Experiments in the marking of sockeye salmon fingerlings were continued and numerous returns are being secured from the fish which were marked, commencing in the fall of 1929.

The Baker Lake station operated only for the purpose of incubating trout eggs during the summer months. However, it was reported that the run of sockeye and silver salmon in the Baker River was the largest for a number of years.

While the two additional substations under the administration of the Birdsview station are concerned entirely with the propagation of trout, it is appropriate to mention that the Mount Rainier substation has now been developed to the point where it is an important factor in maintaining the stock of fish in the park and in the adjoining National Forest areas. Efforts are being made to collect eggs of the cut-throat trout from certain lakes in the park which had been previously stocked with this object in mind.

The other establishment, a series of rearing ponds outside of the city of Spokane, Wash., was placed in operation during the year. Over 500,000 trout and graylings ranging up to 6 inches in size were distributed.

MARINE SPECIES

It has been mentioned elsewhere that there was general expansion of activities at the three New England hatcheries engaged in propagating cod, haddock, pollock, and other varieties supporting the inshore commercial fisheries.

At Gloucester, Mass., a considerable number of spawn-takers were placed aboard local fishing vessels and a tremendous number of pollock eggs were fertilized and planted by this means. Of the 3,000,000,000 cod eggs secured, slightly over 300,000 were propagated at the hatchery, the balance being planted after fertilization on the spawning grounds. Haddock work was relatively unsuccessful at this point. Some propagation of lobster was resumed on an experimental basis. Considerable work was required during the year in the maintenance of the property and equipment due to deterioration during the period of closure.

A Diesel-powered launch was transferred from the Cape Vincent, N. Y., station to Gloucester as a tender.

The Woods Hole, Mass., station made no attempt to propagate cod, and its operations with the winter flounder were seriously hampered by the severe winter. A considerable proportion of the 400,000,000 fry hatched were distributed in the waters of Long Island Sound. The personnel of this station has as usual expended considerable effort in maintenance of the extensive plant, also in assisting in the laboratory work conducted by the Division of Scientific Inquiry during the summer.

At the Boothbay Harbor, Maine, station, following the installation of a new electric pump, considerable overhauling and changing of the piping system was necessary. Severe winter conditions also affected the propagation of flat fish or flounder during the early part of the season. Later results were more favorable, yielding a production of 1,000,000,000 fry. The propagation of cod exceeded that of the previous year. Haddock operations were a minor activity in connection with other major work.

For some years there has been frequent expression of doubt as to the exact value of propagating marine species. This activity is now increasing in popularity and if carried on as an adjunct to commercial fishing operations and not as an end in itself, it appears highly justifiable.

GREAT LAKES SPECIES

With the exception of the Put in Bay, Ohio, station, the handling of the commercial species of the Great Lakes is at a low ebb. Changes in the fishing season in Michigan waters several years ago virtually eliminated the production of whitefish and lake trout at the Michigan hatcheries and at the Duluth, Minn., station.

At the Cape Vincent, N. Y., station, changes in the spawning habits of the fish, particularly concentration in Canadian waters, have greatly reduced the potential egg supply. Consequently, these stations have either been closed or are emphasizing the production of game fish, the commercial varieties being handled as a side line.

The Duluth, Minn., station handled less than a million lake trout and whitefish eggs, but incubated a considerable number of game trout eggs for transfer to rearing stations in the national forests.

During the spring, in cooperation with the State of Minnesota, approximately 10,000,000 pike perch were hatched.

The Put in Bay, Ohio, operations are on a joint basis with the State of Ohio. The Bureau is supervising the collection of the eggs at designated areas and the hatching is being carried on in the nearby State hatchery with the assistance of the Bureau's personnel. The Federal hatchery, however, is maintained in readiness to handle any excess quantity of eggs which might be beyond the capacity of the State establishment. Our egg collections for the year exceeded 52,000,000 whitefish and 500,000,000 pike perch.

The activities of the Cape Vincent, N. Y., station, as regards propagation of game fish and operations of its substations, will be discussed elsewhere in this report. An output of whitefish and lake herring slightly better than last year was obtained. Over 1,000,000 lake trout eggs were also secured from local fishermen. The production at this point could be moderately increased were funds available for the hiring of an adequate number of spawn-takers.

ANADROMOUS SPECIES OF THE ATLANTIC COAST

Atlantic salmon, yellow perch, and shad are the varieties which are propagated for the maintenance of fisheries in the rivers of the East coast. It was possible to obtain from the Canadian Government 1,500,000 Atlantic salmon eggs in comparison with the usual assignment of only 1,000,000. Two-thirds of these were assigned to various hatcheries operated by the State of Maine in conformity with an agreement covering this work. The State attended to the major part of the distribution of the resulting fry and fingerlings. Gratifying reports were received as to the run of salmon in the Penobscot River, and the improvements being made to the fish ways in this river encourage the belief that conditions will be even better in the future.

At the Fort Belvoir, Va., hatchery on the Potomac River, the main activities with shad were conducted. The take of eggs and production of fry were slightly greater than during the previous year. Funds were available to permit the resumption of hatching yellow perch and over 400,000,000 fry of this species were planted locally at very slight cost.

The Edenton, N. C., station likewise reported slightly better results with the shad, taking 4,750,000 eggs. The rigorous winter prevented the collection of yellow perch brood stock at the time when they were spawning and there was consequently no production of this species, or of the white perch. Increasing difficulty is being met in securing shad eggs here because of the fact that the commercial fishery is centered further down in Albemarle Sound and the fish are not ripe when taken. The Edenton station carries on considerable propagation of pond fish, supplementing its work with the commercial varieties.

The cooperative work with the State of South Carolina, whereby the Orangeburg, S. C., station propagates shad at Jacksonboro, was continued, but results failed to meet expectations. Slightly less than 1,000,000 fry were produced, the work being seriously hampered by floods during the spawning season. Special attention is being given to the experimental rearing of shad, and a number of the fry were held in ponds at the close of the year.

GAME FISH PROPAGATION

There was a moderate increase in the output of game fish produced in the interior hatcheries. Some confusion exists as to the exact status of these hatcheries, since the rapid expansion of State fish cultural activities has raised the question of duplication or competition with the Federal hatcheries. The fact is, the demand for game fish is greatly in excess of all current facilities for producing them. Should the Bureau discontinue entirely the stocking of all waters except those directly under Federal jurisdiction, there would still be an outlet for the entire production of all but a half-dozen of the Federal hatcheries in the interior. National parks, national forests, Resettlement projects, the Tennessee Valley Authority, and similar Federal projects constitute a definite obligation upon practically all of the existing hatcheries and present a need for new hatcheries, or at least additional rearing facilities.

The trend toward rearing game fish to larger size before stocking has been recognized, but the continued high cost of fish food has presented a real obstacle to the full accomplishment of this objective. The cooperation of applicants, States, and other Federal agencies in distributing the fish has released greatly needed funds to be applied to production.

There follows a brief outline of the nature and scope of game fish propagation in the various geographical sections.

ROCKY MOUNTAIN TERRITORY

Activities at the Yellowstone Park, Wyo., station overlap the end of the fiscal year and consequently seasonal reports are based upon parts of two fiscal years. For the season of 1934 the egg collections totaled over 30,000,000, somewhat less than during the previous year. The reduction was due chiefly to high water which made it impossible to maintain all of the traps throughout the season. There was a slight decrease in the collection of grayling eggs. Of the total trout egg collection, 65 percent were used to restock Park waters, in comparison with the 60 percent which is the basis of the agreement with the Park Service covering these operations.

Conditions at the Jackson Hole, Wyo., substation serving the Teton National Park were unsatisfactory. An undue amount of disease was encountered and at the close of the fiscal year preparations were being made to transfer the hatchery to a new site on Government owned land under the jurisdiction of the United States Forest Service, where a superior water supply will be available. Efforts are being made to secure local egg-collecting facilities at one of the lakes in that territory. An unusual feature here is the use of elk meat for fish food. This meat is secured from animals which are culled out of the herd due to age, weakened condition, etc.

The Spearfish, S. Dak., station enjoyed a very successful year, having distributed a large number of 3- and 4-inch fingerlings to private applicants and to the United States Forest Service. Among the improvements the major item is the construction of a stone garage as a W. P. A. project. The station was equipped with a new distribution truck. At the close of the year arrangements were being made for the construction of a new hatchery building, this, also, to constitute a W. P. A. project.

Operations at the Glacier Park hatchery were comparable to former years but considerable difficulty was experienced in the water supply system, which repeatedly was clogged with gravel. The necessity for a new and improved hatchery for Glacier Park is realized, and an alternative location is under consideration, but development will necessarily await the securing of an appropriation for purchase of the site and for the construction work.

The Saratoga, Wyo., station made a very satisfactory showing, both in the distribution of fingerlings and in the take of eggs from station brood stock. Some work was performed in improving the station ponds and grounds through C. C. C. detail.

In Colorado the work of the substation at Creede is fast becoming of importance equal to that of the older establishment at Leadville. The latter station distributed over 3,800,000 trout and handled a much larger number of eggs. Egg collections at Lake San Cristobal in the Creede territory represented an increase, 2,500,000 brook trout eggs and 750,000 rainbows having been secured. These eggs are of unusually high quality, 97 percent to 99 percent reaching the eyed stage.

A new dwelling has been made ready for occupancy at the Creede station.

An average production of trout and trout eggs was obtained at the Springville, Utah, station, and in addition thereto a few bass and bream were propagated. The number of fish handled at the Bear Lake, Utah, substation was reduced by about 50 percent, in the belief that a reduction of crowding would relieve the mortality. This was found to be the case and a very creditable output achieved in spite of the smaller number of eggs handled.

The important work in the Montana territory was centered at the Bozeman station, where a duplex dwelling was completed. Several rearing ponds were constructed and improvements made to the station's water supply. Shipments of trout eggs amounted to almost 10,000,000, and 2,800,000 fingerlings were distributed.

In the Madison Valley adverse weather conditions caused an early cessation of Loch Leven egg collections and the take of 14,000,000 was 10,000,000 less than during the previous year. However, collections of spring rainbow eggs were increased. One-half mile of telephone line was constructed for the purpose of affording this substation outside connections.

At the Miles City, Mont., substation devoted to the propagation of warm water fish, 350,000 fingerlings of various species were produced. The production of fingerling bass was approximately 50,000 over that of last year.

A liberal grant of W. P. A. labor at the Hagerman, Idaho, station permitted extensive repairs and improvements, including the construction of ponds and general improvements to the buildings. A very large percentage of the fingerling trout used at this station are from 3 to 6 inches in length when liberated. Rainbow trout eggs are now being obtained from brood stock produced at the station.

The Salmon, Idaho, station was operated jointly with the State of Idaho and served as a base for rainbow egg collection operations at Williams Lake. Over 3,000,000 were secured from this source and the hatching and rearing was handled at the above-mentioned hatchery. Four rearing ponds were built on state property adjoining this establishment.

The Dexter, N. Mex., station is in an entirely different category than other stations in the Rocky Mountain territory due to the fact that it propagates warm-water fish exclusively. Heavy losses of brood stock from the depredations of fish-eating birds affected the production somewhat. However, there was a good hatch of bass which made it possible to distribute 200,000 fingerlings in June and still reserve an adequate number for later distribution.

NEW ENGLAND STATIONS

With the increasing importance of New England as a vacation center the pressure upon the game fish hatcheries in that section is increasing. In Maine the Craig Brook station handled a slightly smaller number of brook trout due to a reduction in the brood stock. The State of Maine also made a reduced allotment of landlocked salmon eggs, furnishing only 100,000. Work with the Atlantic salmon is discussed elsewhere. Considerable trouble was experienced during the year with the water supply dam providing the main supply for the hatchery and a break late in May necessitated complete rebuilding. Arrangements were formulated with the National Park Service whereby that agency will assign C. C. C. labor for the construction of a number of rearing ponds on the station property. These will be used to rear fish exclusively for the waters of the Acadia National Park. It is expected that a number of other improvements will be effected in connection with this program.

The Nashua, N. H., station was subjected to the ravages of the spring floods which virtually wiped out the supply of trout fingerlings on hand. The entire hatchery reservation was flooded and while a few fish were salvaged it was necessary to ship in brook trout fry from other hatcheries in order to secure a greatly reduced output of fish for distribution.

The St. Johnsbury, Vt., and York Pond, N. H., stations were separated administratively, the former being now independent of the field operations at York Pond. At St. Johnsbury unusually good results were obtained in the rearing of landlocked salmon from eggs supplied by the State; 65,000 yearlings were produced, some of them reaching 9 inches in length. The output of brook trout was curtailed due to the poor quality of the eggs transferred from York Pond. Considerable improvements were attempted by W. P. A. allotment. The foundations of several of the buildings were repaired, painting was done, and the drain line to the ponds was renewed. A new heating plant was installed in the hatchery building.

At York Pond there was a combination of unfavorable circumstances which caused a heavy loss of brook trout brood stock, followed by an outbreak of the "soft egg" disease, which makes sporadic appearance, particularly in the New England hatcheries. In consequence the output of fry and fingerlings at this station was below normal and shipments of eggs to other hatcheries produced very unsatisfactory results. The development program continued by virtue of C. C. C. labor and a W. P. A. project. The pond system has been improved and a new well furnishing 100 gallons per minute was developed. The water supply canal to the power-house has been virtually rebuilt. A large ice storage building was constructed, and numerous minor improvements all contributing to the efficiency of the plant have been completed. Experiments in determining cheaper fish foods presented some interesting information but no definite conclusions have been reached as yet.

At the Hartsville, Mass., station operations were of a routine nature with the exception that unusually favorable results were obtained in the collection of smallmouth bass fry in Connecticut, in cooperation with the State Board of Fisheries and Game. Over 840,000 fry were handled. The collection of brook trout eggs from station stock amounted to over 400,000 and a considerable number of excellent fingerlings, ranging up to 6 inches in length, were placed in local waters. No significant improvements or expansions could be carried on during the year.

COMBINATION TROUT AND POND-FISH STATIONS

Most of the establishments in this category are primarily concerned with the propagation of trout, and the production of warm water pond fish is a side line or by-product. At the Manchester, Iowa, station the year's operations were of normal extent. The station brood stock yielded over 2,000,000 rainbow trout eggs and the eggs of other species shipped in produced a quantity of fingerlings adequate for all requirements in that section. The output of smallmouth bass was reduced as to numbers but included a considerable proportion of larger fish. The fish culturist's residence, gutted by fire during the previous year, was rebuilt.

The incomplete status of the pond development program at the Flintville, Tenn., station served to limit the production at that point. Trout of two varieties were produced in numbers fully sufficient to meet requirements in that territory but the inadequate pond space and insufficient brood stock of warm-water varieties was reflected in a negligible production, particularly of bass.

The Neosho, Mo., station reports an unusually favorable season, the sole serious handicap being the loss of several hundred rainbow brood stock due to the severing of a water supply pipe line during road repairs. Attacks of disease were negligible among the rainbow trout. Studies in selective breeding as well as experiments with fish foods were among the important activities at Neosho. Largemouth bass were produced in much greater quantities than during the previous year.

At the Bourbon, Mo., substation, operated on a cooperative basis for the sole purpose of producing rainbow eggs, there was a definite increase in the yield.

The scientific and investigative activities of the Leetown, W. Va., station are the subject of report elsewhere. So far as productive fish cultural work is concerned, the station handled over 2,750,000 trout eggs. Abnormal losses were experienced both among the eggs and fry, due to conditions which have not been satisfactorily determined. Many of the fingerling trout were used in restocking the national forest areas in Virginia and West Virginia. The station bass cultural operations were fairly successful with the production of over 30,000 smallmouth fingerlings in spite of the fact that the ponds were new and leaked badly. A set of raceways were provided with a concrete lining in order to prevent damage to surrounding property through seepage.

The White Sulphur Springs, W. Va., station functioned in a normal manner, cooperating extensively with the State of West Virginia.

The demonstration hatchery conducted jointly by the Bureau and Monroe County, N. Y., near the city of Rochester produced a very satisfactory output of trout fingerlings used extensively in stocking the waters under the control of the county park authorities. A few thousand bass were also obtained.

The Cape Vincent, N. Y., station, together with its substations at Cortland, Watertown, and Barneveld contributed heavily toward the restocking of the trout waters in northern and central New York. Approximately 50,000 smallmouth bass fingerlings were produced in the four acres of ponds available for this purpose.

The most outstanding feature in connection with the work of the Northville, Mich., station was the excellent results obtained at the various cooperative rearing stations maintained during the summer months under the direction of this station. Over 50,000 bass were also produced at Northville, with larger numbers of bream.

The Wytheville, Va., station was the source of a large number of rainbow trout which were used in stocking forest service and national park waters in that territory. The collection of rainbow eggs amounted approximately to 2,500,000. The production of pond fish here was insignificant. Supervised by the superintendent of the Wytheville station, the construction of the new hatchery in the Smoky Mountain National Park proceeded rather slowly due to its isolated location and other factors. At the close of the year the National Park Service had constructed 17 rearing pools and the water supply system had been installed. A hatchery building and a service building were about two-thirds completed and work was progressing on the construction of a residence. In spite of the incomplete status of the project it was possible to handle rainbow trout fingerlings in the rearing ponds during the latter part of the year.

The Lamar, Pa., hatchery received brook and rainbow trout fingerlings transferred from other establishments and reared them over the summer months for fall distribution. Development work has consisted in the construction of additional circular rearing pools, the work being performed by C. C. C. detail.

POND-FISH STATIONS

The majority of these establishments located in the southeastern and south central sections maintained previous records of output and in some instances materially bettered the production of last year. The Mammoth Spring, Ark., station supplied a much larger proportion of its production of bass to the waters of the National Forests in Arkansas and Missouri. 100,000 bass fry were transferred to the State hatchery at Lonoke on a cooperative rearing basis.

The Department of Fish and Game of the State of Georgia assumed full responsibility for the distribution of fish produced at both of the Bureau's Georgia stations. At the Lake Park, Ga., substation the initial use of a new water supply permitted the handling of the propagating pond to much better advantage. However, the actual distribution of fish during the fiscal year 1936 was slight due to the fact that construction work had been under way during the greater part of the year. Conditions at the close of the fiscal year indicated a very satisfactory production during the pending distribution season. W. P. A. labor was largely employed in effecting the foregoing improvements and in maintaining the station property.

The new Harrison Lake, Va., station was on a full productive basis during the year, utilizing 12 large ponds and several small minnow and daphnia ponds. Almost 100,000 bass had been distributed by the close of the year, with a considerable number of fingerlings remaining, as well as a good stock of bream. Severe rains necessitated considerable repair work where the new pond embankments had become eroded. Brood stock was obtained from Harrison Lake which is used as the water supply for the hatchery.

The Tupelo, Miss., station escaped damage from the terrific tornado which visited that section and produced an output of bass approaching previous high records for this hatchery. The production of bream was somewhat reduced, however, due to consumption of the bream fry and fingerlings by the bass.

Inadequacy of brood stock curtailed the production of smallmouth and largemouth bass at the Louisville, Ky., station below the normal average. However, the output was in excess of the previous year. Relief labor is employed extensively at this point in improving the pond system, including the closure of leaks and the renewal of drain and supply lines.

No construction work of any importance was carried on at the Marion, Ala., station, but the output of bass was increased more than 100 percent over last year. A total of over 500,000 bass were handled which, together with the bream, constituted a hatch of more than 1,000,000 total. An unusually good growth was obtained for the bream, a number being 4 inches in length when distributed. Some research work was conducted through the assignment of an investigator to the Marion station but conditions were found to be unsatisfactory for this activity and the program was discontinued at the close of the year.

The Edenton, N. C., station doubled its output of bream and attained a normal yield of bass.

By thorough cleaning of the brood ponds the production at the Orangeburg, S. C., station was increased by approximately 125,000 fish. The removal of the profuse vegetation was most effective in securing this result. The superintendent cooperated in the development of a small auxiliary located a few miles from the main station.

In Texas both of the older stations, located at San Marcos and at Forth Worth, operated in a normal manner with average results. No major changes or improvements were effected. At the new San Angelo, Tex., establishment fish were reared for the first time. Fry were transferred from Fort Worth and San Marcos and reared during the summer months, the total distribution amounting to 47,000 fish.

Work at the new Uvalde, Tex., substation was actively under way from September to the close of the year. The accomplishments included partial completion of two residence buildings, garage, holding shed, and store room. An office and shop building was completed. Nine ponds were virtually finished and a number of others carried well along. A considerable amount of clearing was accomplished; roads and walks were constructed and a pump installed to provide the water supply from a driven well.

At the Natchitoches, La., station a W. P. A. project was perfected and work was started on the development of additional ponds. Six new ponds, each of 2 acres area, were completed. The production of fish was much more extensive than during previous years.

The Tishomingo, Okla., station likewise surpassed the production of the previous year. An interesting feature of the work here was the production of channel catfish.

MISSISSIPPI RIVER TERRITORY

The headquarters for the work in the Mississippi Valley located at La Crosse, Wis., is the center for a number of varied activities. During the past year in addition to the hatching and distributing of over 1,000,000 trout, the La Crosse station supervised the salvage of over 47,000,000 fish from the overflow pools in the Upper Mississippi Wild Life Refuge.

Attention should again be called to the fact that upon completion of the 9-foot channel project the characteristics of the pools to be formed will be such that the rescue work will recede to approximately 5 percent of its present proportions. Greater attention is being given to the establishment of controlled, propagating ponds to provide a source of fish in lieu of the salvaged stock. Three of such ponds were operated during the year, and construction is under way at an additional one. Plans have already been prepared for additional ponds to be constructed as W. P. A. projects, with an ultimate objective of over 400 acres under water.

The Homer, Minn., station was continued in operation as a base for rescue work, and also as a center for overhauling and repairing equipment, boats, trucks, etc.

A limited amount of W. P. A. work was performed at the Lake Mills, Wis., station, resulting in some improvements to the ponds and grounds. An unfavorable spawning season apparently reduced the production of pond fish, less than 50,000 having been secured. Several hundred thousand trout were produced for stocking waters which can be most readily served from this hatchery.

At the Rochester, Ind., station, work was under way during the greater part of the year on the construction of additional ponds as a W. P. A. project. Three ponds were carried to various stages of completion. A fairly successful production of bass and other species was secured and distributed by the State of Indiana. At the same time an auxiliary station at Argos, about 20 miles from Rochester, was being developed, likewise under W. P. A. auspices. This will comprise 5 ponds fed by flowing wells, and 1 building. The drought affected the water supply at the Rochester station necessitating a distribution of the fish earlier than would be preferred.

Activities at the Fairport, Iowa, station were along routine lines, with the production of pond fish running close to normal. In addition some 900,000 fish were salvaged from nearby, overflowed areas, and carp and buffalo eggs were obtained from nearby commercial fisheries and were replanted in local waters after fertilization.

AQUARIUM

The Bureau of Fisheries Aquarium is located under the main lobby of the Department of Commerce Building.

Its display consists of about 1,600 specimens of some 54 species of aquatic animals. Stress is laid particularly on the fresh water game and food fish, and on the most common predators. The greatest single attraction was the seasonal miniature hatchery. Biology students in and near Washington made regular visits when the eggs were hatching.

Cooperation with other public aquaria in the exchange and supply of specimens was a feature of the work. The Aquarium was used as a base for the distribution of fish for the stocking of public waters. A special effort was made to develop more natural habitat conditions in the decoration of the tanks. Considerable success was achieved in the study and control of surface parasites on fish which seemed especially prevalent in this territory this season.

The aquarium has, in brief, served as a most interesting show room or "sample room" for demonstrating the products of the Bureau's hatcheries.

DISTRIBUTION OPERATIONS

The number of applications supplied this year shows a considerable increase over 1935, which is probably accounted for largely by the growing use of trucks for making deliveries. Truck mileage was nearly double that of the previous year.

The distribution cars engaged in the delivery of fish to applicants and transfers between hatcheries this year made 75 trips and carried an average of 250 pails per trip. The cars traveled 48,014 paid miles and 7,329 free miles in delivering fish to applicants. Detached messengers made 56,064 paid miles and 8,404 free miles. Truck deliveries covered 81,009 miles, the trucks being used for short trips and the cars for longer hauls. As usual, the Bureau received free transportation and reduced rates from a number of railroads.

Owing to the prevailing limited funds for distribution purposes, the practice of asking applicants to call at the hatcheries if possible, to receive their fish had to be continued. Upon their failure to do so the applications which could not be filled by messenger were carried over for another attempt to make delivery the following season.

Summary, by States, of the distribution of fish, fiscal year 1936

State and species	Number
Alabama:	
Largemouth black bass	415, 657
Sunfish	452, 885
Catfish	140
Lochleven trout	51, 000
Arizona:	
Black bass	3, 840
Sunfish	15, 960
Arkansas:	
Largemouth black bass	144, 450
Smallmouth black bass	197, 725
Rock bass	11, 000
Sunfish	68, 825
Rainbow trout	900
California: Chinook salmon	10, 572, 413
Colorado:	
Largemouth black bass	15, 000
Rock bass	5, 600
Crappie	4, 000
Catfish	28, 000
Brook trout	4, 519, 610
Rainbow trout	1, 349, 544
Blackspotted trout	1, 200, 000
Lochleven trout	329, 520
Connecticut:	
Smallmouth black bass	315, 200
Rainbow trout	9, 000
Brook trout	3, 000
Delaware:	
Largemouth black bass	9, 290
Crappie	5, 100
Sunfish	8, 375
District of Columbia: Largemouth black bass	15
Florida: Sunfish	2, 375
Georgia:	
Largemouth black bass	297, 227
Smallmouth black bass	81, 125
Catfish	8, 339
Sunfish	749, 950
Brook trout	6, 500
Rainbow trout	26, 390
Idaho:	
Sunfish	7, 700
Brook trout	62, 735
Rainbow trout	1, 423, 450
Blackspotted trout	1, 672, 580
Lochleven trout	52, 000
Steelhead trout	46, 500
Illinois:	
Largemouth black bass	31, 525
Buffalo fish	5, 825
Carp	4, 500
Catfish	20, 735
Crappie	54, 550
Sunfish	57, 225
Yellow perch	1, 600
Lochleven trout	6, 000
Indiana:	
Largemouth black bass	88, 535
Smallmouth black bass	48, 200
Rock bass	22, 000
Crappie	1, 825
Indiana—Continued.	
Sunfish	310, 520
Catfish	12, 400
Yellow perch	8, 600
Brook trout	89, 300
Rainbow trout	89, 850
Lochleven trout	292, 600
Iowa:	
Largemouth black bass	194, 245
Smallmouth black bass	9, 110
White bass	10, 300
Crappie	9, 670, 485
Catfish	3, 728, 750
Sunfish	8, 698, 300
Buffalo fish	1, 101, 400
Drum	1, 444
Yellow perch	88, 319
Pike and pickerel	45, 102
Brook trout	92, 900
Rainbow trout	1, 170
Kansas:	
Largemouth black bass	4, 850
Rock bass	1, 880
Catfish	2, 000
Sunfish	5, 200
Rainbow trout	1, 025
Kentucky:	
Largemouth black bass	24, 275
Smallmouth black bass	78, 510
Rock bass	4, 510
Crappie	150
Sunfish	2, 800
Louisiana:	
Largemouth black bass	213, 504
Warmouth bass	8, 400
Sunfish	14, 538
Maine:	
Smallmouth black bass	66, 100
Brook trout	968, 002
Landlocked salmon	404, 500
Atlantic Salmon	578, 000
Flounder	1, 015, 200, 000
Maryland:	
Largemouth black bass	4, 379
Smallmouth black bass	7, 977
Sunfish	53, 915
Brook trout	21, 932
Rainbow trout	11, 410
Lochleven trout	15, 700
Chinook salmon	2, 400
Silver salmon	3, 000
Massachusetts:	
Smallmouth black bass	239, 200
Catfish	1, 800
Brook trout	129, 657
Rainbow trout	1, 530
Lochleven trout	10, 000
Landlocked salmon	6, 000
Cod	261, 662, 000
Flounder	283, 619, 000
Haddock	9, 588, 000
Pollock	475, 457, 700
Mackerel	767, 000

Summary, by States, of the distribution of fish, fiscal year 1936—Continued

State and species	Number
Michigan:	
Largemouth black bass	7,995
Smallmouth black bass	40,050
Rock bass	2,650
Sunfish	77,500
Brook trout	1,326,375
Rainbow trout	357,702
Lake trout	192,500
Minnesota:	
Largemouth black bass	218,175
Smallmouth black bass	1,310
Crappie	1,763,100
Sunfish	1,002,335
Catfish	75,800
Carp	12,000
Drum	1,900
Pike perch	9,670,000
Yellow perch	4,184
Pike and pickerel	404,150
Buffalofish	100
White bass	2,400
Whitefish	1,275,000
Brook trout	221,200
Rainbow trout	70,550
Lochleven trout	71,600
Lake trout	64,000
Miscellaneous fishes	508,000
Mississippi:	
Largemouth black bass	323,865
Sunfish	189,875
Missouri:	
Largemouth black bass	210,235
Smallmouth black bass	35,140
Rock bass	17,195
Crappie	7,600
Sunfish	31,300
Catfish	1,125
Rainbow trout	35,795
Montana:	
Largemouth black bass	50,628
Crappie	3,200
Sunfish	25,720
Catfish	3,200
Yellow perch	18,718
Blackspotted trout	1,059,120
Brook trout	279,335
Rainbow trout	1,072,895
Lochleven trout	3,850,160
Nebraska:	
Largemouth black bass	24,425
Rock bass	3,500
Crappie	30,125
Sunfish	2,100
Catfish	4,500
Brook trout	217,150
Rainbow trout	214,510
Lochleven trout	151,500
Nevada:	
Brook trout	52,000
Rainbow trout	74,000
Lochleven trout	40,000
New Hampshire:	
Smallmouth black bass	41,150
Catfish	2,625
Brook trout	900,644
Rainbow trout	2,000
Landlocked salmon	13,500
New Jersey:	
Largemouth black bass	8,500
Smallmouth black bass	300
Crappie	750
Sunfish	3,100
Catfish	600
Yellow perch	450
Brook trout	2,400
Rainbow trout	5,520
New Mexico:	
Largemouth black bass	351,140
Crappie	6,900
Sunfish	79,875
Catfish	21,055
New Mexico—Continued.	
Blackspotted trout	55,000
Brook trout	16,000
Rainbow trout	239,000
New York:	
Largemouth black bass	6,200
Smallmouth black bass	113,402
Crappie	60
Catfish	1,600
Flounder	142,465,000
Lake Herring	2,740,000
Whitefish	3,125,000
Brook trout	330,742
Rainbow trout	101,860
Lochleven trout	188,243
Landlocked Salmon	42
Lake trout	570,535
North Carolina:	
Largemouth black bass	87,858
Smallmouth black bass	1,000
Rock bass	13,400
Crappie	900
Sunfish	44,740
Yellow perch	385
Warmouth bass	1,855
Shad	2,000,000
Brook trout	111,950
Rainbow trout	547,635
North Dakota:	
Largemouth black bass	5,082
Crappie	64,776
Sunfish	36,270
Catfish	1,200
Rainbow trout	9,000
Lochleven trout	15,000
Ohio:	
Largemouth black bass	28,929
Smallmouth black bass	3,945
Rock bass	5,500
Crappie	2,890
Sunfish	18,850
Catfish	7,325
Pike perch	493,280,000
Rainbow trout	30,000
Oklahoma:	
Largemouth black bass	137,135
Crappie	76,080
Sunfish	174,010
Catfish	15,805
Warmouth bass	26,400
Rainbow trout	900
Oregon:	
Blackspotted trout	192,800
Brook trout	132,700
Rainbow trout	274,000
Chinook salmon	24,089,980
Silver salmon	708,080
Steelhead trout	346,789
Pennsylvania:	
Largemouth black bass	22,225
Smallmouth black bass	650
Rock bass	1,450
Crappie	5,765
Sunfish	37,050
Catfish	12,475
Yellow perch	1,650
Brook trout	472,230
Rainbow trout	309,390
Lochleven trout	100,710
Rhode Island: Smallmouth black bass	45,000
South Carolina:	
Largemouth black bass	313,242
Warmouth bass	17,482
Crappie	1,812
Sunfish	192,871
Catfish	1,794
Brook trout	19,000
Rainbow trout	196,990
Lochleven trout	18,500

Summary, by States, of the distribution of fish, fiscal year 1936—Continued

State and species	Number
South Dakota:	
Largemouth black bass	22, 716
Crappie	22, 526
Sunfish	6, 660
Catfish	16, 200
Yellow perch	150
Blackspotted trout	30, 816
Brook trout	767, 800
Rainbow trout	530, 244
Lochleven trout	169, 200
Grayling	90, 000
Tennessee:	
Largemouth black bass	74, 765
Smallmouth black bass	20, 000
Rock bass	19, 600
Crappie	50
Sunfish	234, 355
Brook trout	139, 300
Rainbow trout	325, 368
Lochleven trout	60, 000
Texas:	
Largemouth black bass	276, 030
Crappie	59, 825
Sunfish	157, 830
Catfish	5, 650
Utah:	
Largemouth black bass	2, 514
Blackspotted trout	446, 000
Brook trout	637, 057
Rainbow trout	768, 358
Lochleven trout	294, 000
Silver salmon	124, 100
Golden trout	11, 100
Grayling	22, 700
Vermont:	
Largemouth black bass	45, 250
Catfish	375
Blackspotted trout	7, 063
Brook trout	361, 791
Rainbow trout	176, 768
Lochleven trout	500
Grayling	2, 185
Landlocked salmon	126, 640
Virginia:	
Largemouth black bass	107, 567
Smallmouth black bass	10, 196
Rock bass	15, 420
Warmouth bass	75
Crappie	2, 534
Catfish	10
Sunfish	78, 759
Brook trout	139, 175
Yellow perch	2, 302
Rainbow trout	516, 294
Virginia—Continued.	
Shad	125, 000
Silver salmon	24, 000
Washington:	
Largemouth black bass	23, 620
Crappie	23, 080
Sunfish	1, 848
Catfish	3, 900
Blackspotted trout	1, 438, 400
Brook trout	734, 545
Rainbow trout	959, 245
Lochleven trout	78, 000
Steelhead salmon	459, 600
Grayling	250, 000
Chinook salmon	21, 425, 310
Chum salmon	14, 168, 067
Silver salmon	3, 663, 970
Sockeye salmon	15, 378, 500
West Virginia:	
Largemouth black bass	8, 528
Smallmouth black bass	62, 267
Rock bass	3, 100
Crappie	4, 320
Sunfish	91, 200
Catfish	200
Blackspotted trout	700
Brook trout	433, 300
Rainbow trout	875, 564
Lochleven trout	423, 421
Wisconsin:	
Largemouth black bass	285, 600
Smallmouth black bass	9, 685
Rock bass	1, 225
Crappie	3, 688, 190
Sunfish	2, 116, 263
Catfish	565, 780
Yellow perch	24, 191
Buffalofish	120, 800
Carp	545, 000
Pike and pickerel	326, 000
White bass	4, 300
Miscellaneous fishes	617, 200
Brook trout	596, 800
Rainbow trout	305, 300
Lochleven trout	430, 600
Wyoming:	
Largemouth black bass	95, 335
Crappie	824, 000
Sunfish	24, 498
Catfish	119, 600
Blackspotted trout	7, 477, 284
Brook trout	1, 118, 256
Rainbow trout	841, 385
Lochleven trout	615, 510
Grayling	4, 810, 500

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PROGRESS IN BIOLOGICAL INQUIRIES, 1935[1]

By Elmer Higgins, Chief, Division of Scientific Inquiry

[With the collaboration of investigators]

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[1] Administrative Report No. 26, appendix IV to the Report of the U. S. Commissioner of Fisheries for 1936. Approved for publication May 17, 1937.

INTRODUCTION

Conserving our natural resources is no new concept of the twentieth century; it was a matter of concern in this country a hundred or more years ago. Today practically all people are agreed that it is a matter of common and vital necessity to the welfare of the country.

But while there is no longer a need for defending conservation, or even for justifying the existence of agencies for its wise application, there is constant need for re-defining it; for "conservation" is one of those flexible words that has been bent into many different meanings to suit many different purposes. The phrase, "conservation of fisheries", for example, has whatever connotation a person wishes to give to it.

To many people, perhaps even to most, it implies some form of prohibition. To some it means prohibiting all people from fishing, so that all fish may live their lives in the ocean and in the streams forever unmolested; to others, it means prohibiting only other people from fishing, so that they themselves can enjoy exclusive right to pursue their piscatorial pleasures without competition.

In the face of such confusion, then, what does the Bureau of Fisheries mean by conservation? It means precisely what a business organization does when it refers to a conservative financial policy. In other words, it is the practice of getting for the most people the greatest value from resources without impairing the capital—living off the income without cutting into the principal.

It is generally agreed that a business organization can neither formulate a conservative fiscal plan without a considerable background knowledge of business principles, nor can it maintain a continuous conservative policy without a constant study of current business conditions. Hence the need for economists, market specialists, accountants, etc. In the same way it is impossible for the Bureau of Fisheries to formulate a conservative plan for administering the fisheries without a background knowledge of biological principles, and impossible to carry out such a policy without a continuous current study of conditions affecting the fish. Hence the need for a permanent staff of aquatic biologists. The Division of Scientific Inquiry of the Bureau of Fisheries carries on such a continuous program; and this report sets forth briefly the results obtained during 1935. It must be clear from the following pages that the several researches here recounted are not short, completed studies, but long-term ones, for which this report represents but a small segment.

One of the most significant facts which is becoming ever more apparent is that the service which the Division of Scientific Inquiry offers cannot nearly meet the demand, for the service is considerably limited by the funds at hand. An investigation on a single fishery is seldom a one-man project, particularly when the species studied is widely distributed, when data must be gathered simultaneously from widely separated regions. In fact it is usually inadvisable even to attempt a serious one-man investigation on a large and important fishery. Consequently many species must remain unattended until resources are available to undertake proper studies on them. Even the current investigations have all been considerably circumscribed during the past several years as a result of curtailed funds. Nevertheless, much progress has been made during 1935.

As our knowledge of the vast, continually changing network of factors influencing aquatic life increases from year to year, it becomes ever more possible to conserve the fisheries by management rather than by restriction. Thus, for the fresh water species throughout the country, much progress has been attained in making the inland waterways biologically more habitable and productive. This is being accomplished in two ways: first, by discovering sources of pollution and encouraging their elimination, usually with the friendly cooperation from owners of factories and mills bordering the waterways; second, by developing methods of improving the natural environment in streams so as to make them more productive of fish life.

The populations of fresh-water fishes have continued to be maintained and distributed by stocking from hatcheries. Current research in this field is devoted mostly to improving the breed of stock so as to obtain the highest fecundity and fertility; also to developing the most efficient feedstuffs so as to get the most fish per pound of feed. There is still an enormous amount of research to be done in the field of aquiculture, however, particularly with reference to the relation between environmental influences and population growth and decline.

As for the commercial fisheries, the most important work in this field has been the development of our knowledge concerning the causes of the great fluctuations in abundance which so deeply affect the fishing industry. The complicated interrelations between these fluctuations, the fishing intensity, the population abundance, and the birth and mortality rates continue to be the subject of intensive studies.

Another important phase of activity in the Division of Scientific Inquiry is concerned with the shellfish industry, particularly with respect to oysters. The most productive work in this field during 1935 has been the development of effective methods for curbing the destructive enemies of the oyster, namely, the starfish and drills. As was pointed out in the 1934 report, however, there still remains a vast amount of work to be done in the field of oyster culture and oyster farming.

COOPERATION

An effective program of conservation through management is impossible without the wholehearted cooperation of all the people directly or indirectly affected by such a program. It is gratifying, therefore, that States, other Federal departments, and private industry are working with the Bureau of Fisheries more than ever in carrying on scientific fishery investigations. But it must be pointed out that even this much cooperation is not enough. It is true that the provision of biologists, of laboratory facilities, of boats, of test streams, of moral support goes a long way toward achieving the scientific knowledge that is needed for intelligent fishery management; but this knowledge will be of little use until neighboring States cooperate with each other in formulating, passing, and enforcing effective and consistent conservation legislation. That is work of the States that remains to be done in order to make these scientific investigations useful.

PUBLICATIONS SPONSORED BY THE DIVISION OF SCIENTIFIC INQUIRY DURING THE YEAR 1935

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NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

O. E. Sette, *in charge*

With an upturn of fish prices accompanying the return of meat prices to nearly normal in 1935, activity in the fishing business has reawakened. Trawlers that had been tied up in previous years saw increasing activity, and new ones are being built. The mackerel fleet, which had been experimenting with curtailment of production, resumed unrestricted fishing and landed the largest catch of the present century. The fleet of smaller boats has seen additions to its numbers, and increases in efficiency through new and larger motor installations. A further evidence of increased activity was the development during 1935 of large-scale commercial use of the rosefish. This species hitherto was practically unused but now is being marketed on a large scale, landings totaling 17,000,000 pounds in 1935 as compared with 2,000,000 pounds during the previous year. Similar development is taking place with respect to sea robins caught in the winter trawl fishery off the Virginia Capes.

As to the condition of the resources, the haddock fishery continues to be most productive on the grounds lying off Nova Scotia where the fishery has been concentrated during recent years. On the nearer grounds such as Georges Bank and South Channel, the yield continues low, and, though somewhat improved over the previous year, the level of abundance is still far below that of 1920. Indications are strong that general adoption of the "savings gear"[2] developed by the haddock investigators would bring about a more decided improvement in future yield. Mackerel is at a high level of abundance mainly as a result of the unusually productive spawning seasons of 1930, 1931, and 1933. Among the shore fishes of the Middle Atlantic coast scup and butterfish are maintaining their productivity under the present amount of fishing but squeteague, especially the younger and smaller sizes, undoubtedly are being subjected to more intense fishing than is consistent with obtaining the maximum yield.

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[2] Modifications in gear to curtail the destruction of undersized fish in otter trawling, by William C. Herrington. Investigational Report No. 24, U. S. Bur. of Fish.

It is to be regretted that a more complete survey of the condition of the fishery resources is not possible. Limitations of funds and personnel are such that only a few of the important species can be studied. The cod fishery is being more thoroughly fished as the haddock supply has diminished, and during the last several years the portion of the population south of Cape Cod has become notably sparce. Whether this is owing to natural causes or to undue exploitation is unknown. The yield of flounders is diminishing year by year in spite of greater utilization of those that formerly were considered "trash." It is unknown whether this decline in productivity might not have been avoided or might not still be halted; nor is it known whether restrictive legislation on flounder fishing now in force in some States is beneficial. What should be done to halt the declining lobster catch is a further question. In fact, each major fishery is in need of study.

Even the species that are being studied cannot be given the attention that they deserve. There are pressing needs for more adequate treatment in each field. In the Middle Atlantic section there should be experiments to devise methods of fishing that would save young fish from destruction. The mackerel investigation needs facilities for work at sea to further unravel the mystery of spawning failures so as to foresee the crop of yearling mackerel (tinkers). The haddock work also needs sea-going equipment and, further, should have clerical assistance to keep the statistical analyses up to date, for it is by these means only that the conditions of the resource may be known.

It is obvious from the nature of the problems facing the fishery investigator, that accurate and detailed statistical information is essential. For the most part, it is necessary to collect special series for each biological study, but the regularly collected, total-yield statistics are also needed. To render them more suitable for biological purposes, a revision of the method of reporting landings at the principal New England ports, with special reference to area of origin, was worked out in conjunction with the Division of Fishery Industries and will be put into effect in the ensuing year. The areas were delineated in collaboration with members of the North American Council on Fishery Investigations, and it is anticipated that eventually the statistics of all countries participating in the American North Atlantic fisheries may be reported according to a uniform scheme of statistical areas.

Before passing on to the details of results, it is appropriate to acknowledge gratefully the courtesy of Harvard University in providing the staff with quarters in its Biological Laboratories; the cooperation of the Woods Hole Oceanographic Institution, especially in assigning its research vessel *Atlantis* to certain haddock trawling cruises; and the personal interest of Prof. Henry B. Bigelow in advising the staff on many phases of the work. It is a pleasure also to acknowledge the kindness of fishermen and fish dealers in permitting the use of their records and in other ways cooperating in the work.

Two subjects, cod and flounder, considered in separate sections in previous annual reports, are not so treated herein. In both instances the material consists of returns from taggings done in years prior to 1933. Although a few returns continue to be reported, they do not affect the conclusions previously derived from these experiments. William C. Schroeder, formerly of the staff of the United States Bureau of Fisheries but now connected with the Woods Hole Oceanographic Institution, carried on the cod investigations formerly and still maintains his interest in the subject. To supplement the evidence received from tagging, he is making a study of the structure of scales collected from tagged individuals. Results from this research may be expected at a future date.

HADDOCK

The total quantity of haddock landed at principal New England ports in 1935 reached nearly 157,000,000 pounds. (This includes all United States' landings except relatively small amounts landed at minor ports.) This was 23 percent greater than the catch of the previous year; in fact, the largest since 1930, and the fourth largest in the history of the fishery. As in 1934, the greater part came from the fishing banks lying off the Nova Scotian coast (Sable Island, Banquereau, Browns, and La Have); landings from this area increasing from about 82,000,000 pounds in 1934 to 91,000,000 pounds in 1935. Georges Bank continued in a minor role, although the catch increased from about 39,000,000 pounds in 1934 to 63,000,000 pounds in 1935. This was 40 percent of the total haddock catch, whereas in earlier years Georges averaged nearly 80 percent of the total.

One of the first objectives of the program of investigation laid down in 1930 was to obtain a sound understanding of changes in the haddock catch such as occurred during 1935. From this, the program was directed toward the determination of the productivity of the fishery at various levels of fishing intensity in order to make possible the development of a plan of rational exploitation that would produce a maximum permanent yield at a reasonable cost of production. This program was in line with the general theories of fisheries investigations developed by Dr. William F. Thompson, director of investigations, International Fisheries Commission, who has affected materially the trend of the haddock work through earlier association with some of the investigation's personnel.

Although realization of the above objective requires a longer period of observation and more thorough analysis than has been possible with present personnel and facilities, there has been considerable progress along the lines of study described in previous annual reports. This includes particularly the collection and analysis of commercial catch records to obtain a measure of changes in abundance; and the study of extensive haddock length-frequency and scale samples to determine growth rate, mass movements, and the age and size composition of the population. The work has continued under the direction of W. C. Herrington assisted by J. R. Webster. Limitation of funds and personnel restricted field work mainly to the Boston Fish Pier where vessel interviews regularly provided information as to fishing time, position, and other relevant data for all haddock trips. Field observations included 2,620 interviews, 66,000 length measurements, and 4,200 scale samples. F. E. Firth handled most of the fish-pier work during the winter. Temporary personnel was employed during the summer while Mr. Firth was assisting in the mackerel investigation. In addition to the field work at the fish pier, two trawling trips were made on the *Atlantis* to obtain material for the study of the abundance, distribution, and growth of 1-, 2-, and 3-year-old haddock which, being below marketable size, cannot be obtained from the commercial catch.

Georges Bank and adjacent areas.—As stated in the 1934 annual report, the success of the fishery on Georges Bank during any year, that is, the return for a given unit of fishing effort, is primarily dependent on two factors: (1) The rate at which the commercial stock declines as the result of catch and natural mortality. (2) The contribution to the commercial stock from the young haddock spawned 3 years earlier. There can be no sustained improvement in the catch except through the growth to commercial size of a large group of young haddock. Mass migrations do not appear to be an important factor; at least, they have not been since our detailed observations began.

A feature of the last 4 years has been the appearance of 3 fair year classes in the commercial catch on Georges Bank. These classes were spawned in 1929, 1931, and 1932. Of these, the 1929 class was the best and served to increase the fishermen's catch considerably in 1932. The 1931 and 1932 classes were less successful, and under a fishing intensity such as prevailed on Georges in 1927–33, hardly would have maintained the level of the fishery in 1934 and 1935. However, during these years a large portion of the fishing fleet was diverted to the Nova Scotian banks as a result of poor fishing on Georges and improved catches elsewhere. Hence, the fishing intensity on Georges decreased to less than half that of 1933 and earlier. With this lessened strain, the Georges haddock stock has increased for 2 successive years, the first 8 months of 1935 providing an average daily trawler catch about 30 percent better than the same period in 1933.

The moderate improvement in the fishery on Georges during the past 2 years has been encouraging, although the present population is far below the level prevailing in the years prior to 1930; and partial recovery occurred only with a greatly reduced fishing intensity.

The trend of the Georges Bank haddock fishery in 1936 depends on two elements now but qualitatively known. First, the abundance of the 1933 class which reaches commercial size in the winter of 1935–36. Second, the distribution of the trawling fleet, i e., the amount of fishing effort that will be expended on this bank in 1936. The first element—abundance of the 1933 class—cannot be evaluated until later in the year when it has been possible to analyze data from the winter fishery. However, cursory examination of incomplete records indicates that it may approximately equal the classes of 1931 and 1932. The second element—distribution of fishing effort—could be estimated if the relative abundance of fish on Georges and Nova Scotian banks were known. This too can be but roughly estimated until the results of the winter fishery can be analyzed. In view of a probable decrease in the catch per day on the Nova Scotian banks and an increase on Georges, one may expect a larger percentage of fishing effort to be concentrated on Georges Bank in 1936. This increased strain will, to some extent, counteract the expected increase from the 1933 haddock year class. Therefore, the final 1936 results should be a total Georges Bank haddock catch considerably greater, and an average daily trawler catch about the same or a little better than in 1935.

Nova Scotian Banks.—The haddock catch on the Nova Scotian banks in 1935 totaled 91,000,000 pounds, an 11-percent increase over 1934, resulting primarily from augmented fishing effort. During the first 8 months of the year the average daily catch per trawler was about the same in 1935 as in 1934, indicating that the fishery apparently has not yet made serious inroads into the stock of marketable haddock. However, the catch has been maintained partly as the result of the extension of the fishery to the eastward on Quereau.

Our knowledge of the haddock population off the Nova Scotian coast is less complete than for that on Georges Bank, but it appears that the success of the fishery depends on the same factors, i. e., mortality rate and the contribution to the commercial stock from the younger year classes. If this be true, the 1936 fishery should be somewhat below the 1935 level unless the 1932 year class (which will begin to reach commercial size in the summer of 1936) is relatively abundant.

There have been some indications that insofar as the spring season (that is, the spawning period) is concerned, a new year class does not exert a maximum effect on the commercial catch during the first year its members reach marketable size. Thus, although the 1929 class reached marketable size in the summer and fall of 1933, the catch per day in the following spring (1934) was not so great as in the spring of 1935. But during the summer of 1934 the catch was considerably greater than during the summer of the following year.

Requirements of the investigation.—In the above discussion the trend of the fishery has been considered mainly in qualitative terms. The most pressing requirement now is a more complete analysis of material so that the various elements determining the success of the fishery can be studied quantitatively. Only then can we accurately describe the causes of fluctuations in abundance, or predict the effect of measures designed to improve the catch. Length-frequency and scale data particularly need more thorough study which limitations of time and personnel so far have made impossible. The haddock fishery is pursued on a large scale throughout the year, and extends over a wide area from Nantucket Shoals to the Grand Bank of Newfoundland. Consequently, an extensive series of data is required to follow the fishery, and there is no slack season in which to bring the analysis up to date.

Some special problems could not be given sufficient attention during the past year. An accurate measure of the annual variations in haddock abundance is of fundamental importance to this investigation. In general, these variations are shown by the availability of haddock to the fishermen, which is measured by the average daily catch per trawler. But a change in the efficiency of the fishing boats whose catches are analyzed will distort this measure of abundance. Such a change took place during the years 1929–31 when the fleet changed over from the ordinary otter trawl to V. D. or semi-V. D. gear. An analysis not yet completed indicates that this increased the efficiency of the fleet by at least 25 to 30 percent.

Another distortion appeared in our measure of haddock abundance on Georges Bank when in 1934 the fleet of large trawlers shifted a large part of their fishing activity to the Nova Scotian banks. Georges was fished only when the yield was particularly good; therefore, the catches of these boats give too high an average for 1934 and 1935. The extent of this distortion must be determined before quantitative interpretation of the data is possible.

If available knowledge is to be used to prepare for the fishing industry a reliable forecast of the trend of the fishery for one or more years in advance, one other type of datum is absolutely necessary. This is an annual evaluation of the abundance of young haddock in year classes below marketable size. These data also would enable us to obtain a measure of the natural mortality rate of young haddock. To secure such data requires considerable trawling with special gear. No extensive work of this kind has been possible due to lack of vessel facilities, but during the past year some exploratory work was done on the *Atlantis*, made available by courtesy of the Woods Hole Oceanographic Institution. Only qualitative conclusions are possible from the material so far collected. Quantitative results would require the use of a vessel equipped for regular trawling and a number of comprehensive cruises each year.

Hydrography.—During the years 1931–34, hydrographic data were collected and drift bottles released over an area covering Georges Bank and Browns Bank. The cruises were made during the spring of the year to obtain data for the study of ocean currents and their effect on the drift of haddock eggs and larvae spawned in this region. Although no field work of this kind was done in 1935, 25 drift bottles were received from the April 1934 experiment and two from the experiment of June 1933. From the 1934 experiment there now is a total of 91 returns from 629 released. Of these, 16 percent came from west and south of Cape Cod, 42 percent from the Gulf of Maine, 13 percent from the Nova Scotian and Newfoundland coast, and 24 percent from Europe. One-half of the 1934 drift bottles were painted a brilliant yellow and released alternately with clear glass bottles. A red card was enclosed in the unpainted bottle. At the end of 1935 returns from painted bottles were 27 percent higher than from unpainted ones.

Although attainment of the general objectives of the investigation remains for the future, certain lines of study have already yielded results of immediate practical importance. Extensive field work in 1931–32 showed that the trawling fleet annually destroys great numbers of small haddock below marketable size. This number varies according to the abundance of young fish on the banks and the number of boats fishing. In 1931 on Georges Bank it reached an estimated total of more than 60,000,000 baby haddock compared to a catch of not much more than 30,000,000 of marketable size. Since then the destruction has been less, not because the fishery has been less destructive but because baby haddock have been less numerous and the fishing intensity has been reduced by the diversion to the Nova Scotian banks of a considerable part of fishing operation. Nevertheless, the situation continues wherein every brood of young fish is subject to a period of extensive destruction during its early years before it reaches marketable size. This loss of young haddock serves to increase the drain on the fishery to nearly the same extent as the capture of equal numbers of marketable haddock. In other words, this destruction in some years doubles and trebles the strain on the fish population, and on the average must form a very considerable part of the fishing mortality. There also has been an increasing trend toward the marketing of smaller haddock, many averaging little more than half a pound in weight. Given another year on Georges Bank, these fish would treble in weight while in 2 years they would weigh nearly five times as much and be of more value per pound.

Recommendations.—There appear to be four possible measures that would decrease the destruction of undersized haddock. These are closed seasons, closed areas, minimum market size, and minimum mesh size. Of these, the most effective and practical are a minimum mesh size and a minimum market size. In 1931 and 1932 a practical type of "savings gear" for the New England otter-trawl fishery was developed through an extensive series of experiments. A report on this work was published in 1935 recommending a minimum mesh size of 4¾ inches for use in all otter trawls. So far, little action has resulted from this recommendation in spite of the clear evidence in its favor.

A more popular description of the savings-gear work and of the importance of saving undersized fish, is in preparation for use as a fisheries circular. It is hoped that this will find a wider audience because of its less technical nature. Certainly, convincing the trawler operators and fishermen of the importance of protecting small fish is a prelude to any effective action.

Savings gear experiments have demonstrated a practical method by which the strain on a fish population can be decreased without the application of any restriction such as closed seasons or closed areas. Adjustment of mesh size to reduce the destruction of small unmarketable haddock certainly will reduce the strain without curbing the fishery. Furthermore, in cases where over-exploitation is reducing a fish population to uneconomic levels of abundance, adoption by the operators of a suitable mesh size should prove more effective in conserving the fishery than restrictions such as closed seasons or closed areas. Once growth rates and natural mortality rates have been established, it appears possible to determine the average fish size that will produce a maximum catch over a period of years without depleting the population. Then, by proper adjustment of the selective gear (mesh size in the case of the otter-trawl fishery), it should be possible to eliminate from the commercial catch a large proportion of the young, rapidly growing fish below this size. If this permits the survival of an adequate spawning stock, it may well be that such protection would be sufficient to prevent real depletion, irrespective of the intensity of the fishery. In the case of the North Atlantic haddock, we do not yet have such data as will permit the determination of this optimum size, but there is some indication that on the Nova Scotia banks it may be not far from the present accepted minimum commercial size.

MACKEREL

With the resumption of unrestricted fishing in 1935 the offshore fleet landed 53,000,000 pounds of mackerel, the largest catch of the present century. Though a record catch, it is not much larger than others of recent years, for the mackerel population has been in a phase of high abundance during the last 10 years. The average annual catch for the decade ending with 1935 was 41,000,000 pounds, which is a marked increase over the previous decade with its average of 17,000,000 pounds, and in even more striking contrast with the decade ending with 1915 when the average was only 11,000,000 pounds. But even the present high level is not to be regarded as the apex of yield for in the decade ending with 1885, the average was 80,000,000 pounds, an amazing yield compared with present experience.

This brings into high relief the dominating feature of the mackeral resource—its extreme fluctuations in yields. To find the causes of these fluctuations and to discover means of turning this knowledge to economic advantage has been the purpose of the research on the mackerel fishery.

The studies which have been under way since 1925 have proven that the changes in yield are mainly caused by changes in abundance of mackerel, and only secondarily by variations in the rate of fishing or by extensive migrations of the fish. Further, it has been learned that the changes in abundance are due to great differences from one year to another in the numbers of young mackerel that survive to commercial size.

The present state of knowledge has been arrived at by the study of changes in the mackerel population by the sampling method. In 1935, as in previous years, this work has been under the direction of Oscar E. Sette, who was assisted in the field work by Frank E. Firth. Basic data collected were the statistics on daily landings of each vessel of the fleet, information from interviews with fishermen covering 1,371 of the 2,560 fares landed, and samples of 51,347 mackerel from 752 different catches. For purposes of determining age composition of the population, length measurements were taken of all samples. In addition, meristic characters such a fin spines and rays were measured on 1,169 individuals to serve as an indication of subdivisions or "races" in the population.

In the laboratory, time available after meeting current demands was spent in organizing for publication the results of 10 years' accumulation of data. This has involved refinement of the method of statistical treatment to measure abundance, development of means of treating length measurements of mackerel to provide suitable accurate age-composition estimates, and their application to the 10-year series. In addition, some progress was made in analysis of tow-net collections of eggs and larvae of the season of 1932. That season is now known to have contributed but few recruits to the stock and therefore must have been one of high "infant mortality." The most commonly accepted theory of the cause of such year-class failures has been that the newly-hatched young do not survive the yolk-sac stage. But the data of 1932 do not indicate an appreciably higher rate of mortality at this supposedly critical point than during subsequent stages. If this is confirmed by examination of other years' data, it will have important bearing on further search for the causes of failures in year classes—a phenomenon occuring not only in the mackerel but in many important food fishes. This problem has been a perplexing one to the students of fisheries biology, and has not yet been satisfactorily explained in the case of any marine species.

While each year's study has added considerable knowledge to the store needed for rational exploitation of the mackerel fishery, the problem is so complex that the goal is yet far from attainment.

With fluctuations the dominant feature in this resource and with their causes due to natural conditions not subject to control by man, the problem of proper utilization depends on making the most of what nature provides. There are at least two problems involved in providing the information needed to bring about such wise use. Most obviously useful is to find means whereby the fluctuations may be anticipated so that fishing and distribution may be adjusted to the rapidly changing volume of supply. The other is to find out what age (or size) of mackerel may best be fished in order to get the most of each year class, and to find means of encouraging the methods of fishing that, on the average, will take such sizes.

Considerable progress has been made in developing means of foreseeing the changes in the supply of mackerel. Predictions have been prepared and, except in the case of 1935, published at the beginning of each season since 1928. Within their scope, these predictions have been encouragingly close to the mark but their utilization by the industry has not been extensive. This appears to be due to their being restricted to estimates of only the larger sizes of mackerel, and further limited to estimates of the probable results of the season as a whole rather than its separate parts. Our present inability to predict abundance of small mackerel (under one pound) is serious because frequently a large portion of the catch consists of these small mackerel, known as "tinkers" to the trade, and their abundance often makes the difference between a good and bad season. Similarly, the changes in abundance within the season often are more important than the total catch for the year because the principal means of adjustment is to freeze or process surplus fish; and to adjust such operations to the season's run it is necessary to know when the surplus will be greatest. For instance, dealers are loath to freeze fish early in the season even when the market is full and prices low, for fear that later the oversupply may be still greater and prices still lower.

To be able to predict abundance of tinkers and thus round out the forecast service requires that their abundance be measured during the first year of life, which in turn requires special observations at sea that can be made only by means of a research ship. Work on this phase had progressed to a promising stage, but ceased in 1932 when the *Albatross II* was decommissioned for lack of operating funds. Although observation in this field has been discontinued, the analysis of results is still under way (as above mentioned) and will have important bearing on any future work in this field.

The problem of predicting the "run" at various parts of the season is amenable to solution. There are indications that there exist, within the mackerel population, different types whose habit is to appear fairly regularly at certain times and places, depending on their age. These peculiarities were taken into account in the prediction for the 1935 season and pointed toward an unusually large run in the offing of southern New England in the spring season tapering off by the middle or end of August. This proved to be the case, experience differing from prediction only to the extent of the disappearance of these fish about 1 week later than the predicted date. As for the remainder of the season, no prediction was ventured, for tinker mackerel were likely to dominate that portion of the season and there was no means of foreseeing the abundance of this category.

More important than predictions, in the long run, is the determination of the best stage in the life history for commercial exploitation. Generally speaking it pays to let fish "grow up" before catching them, for the small and young grow very fast, and the gain from added weight far exceeds the loss from mortality. But in the case of the mackerel it is not a matter of simply balancing growth increase against mortality loss. The population appears to contain two types (perhaps races) of mackerel. One type, which for convenience has been designated "persistent", has an apparent mortality (decline in catch per unit of fishing effort) in the neighborhood of 20 percent; the other, termed "transitory", has one of 70 or 80 percent.[3]

Other peculiarities of the two types such as time and place of occurrence, growth rates, etc., lead one to believe that the differences in apparent mortality are not merely chance variations but are linked with the habits of the fish. If the high apparent mortality of the transitory type is the result of fishing out too large a percentage per annum because they school inshore and are readily accessible to the fishermen, then it would pay to lessen the fishery strain; but if, on the other hand, the mortality is apparent rather than real, and disappearance is due to changes in habits of the mackerel as they grow older, such as a tendency to swim deeper, or a tendency to scatter rather than to school, or even to migrate to distant waters, then it would pay to take them while they are easy to catch even though they be small. Such little evidence as is available favors the latter view; but to make certain it is necessary to perform large-scale tagging operations and perhaps extend other field observations into waters off the coast of Canada—projects that are beyond present facilities. None the less, some work on this phase was accomplished during 1935 by a less expensive (and also less promising) method involving studies of meristic characters to distinguish different races or types within the population. Since the subdivisions of the population may be expected to occur mixed at one time and separate at another, and to change in locality with increase in age, the subject is more complex than the usual racial study and hence less likely to yield to this method of investigation.

SHORE FISHES OF THE MIDDLE ATLANTIC STATES

The ultimate object of these investigations, under the direction of R. A. Nesbit, is to provide a rational basis for more efficient utilization of the fishery resources of the waters between Cape Cod and Cape Hatteras. Two requirements must be met if this objective is to be attained: (1) The life histories and conservation needs of all important species must be known; and (2) some provision must eventually be made for unified administration.

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[3] See Outlook for the Mackerel Fishery in 1933 by O. E. Sette; Bureau of Fisheries, Fishery Circular No. 14, pp. 11–12. May 1933.

Thus far, limited appropriations have permitted inclusion of only a few of the several important species in the investigational program, and it has not been possible to maintain continuous and simultaneous observation of even these few over the whole region. This is unfortunate for it has become increasingly apparent that all important species and all localities must be considered together in drafting conservation recommendations. The more productive forms of fishing gear, pound nets, otter trawls, and purse seines, take more than one species, so that protection of one species may interfere with legitimate exploitation of other species. In order to complete the program and to render effective the results of past efforts, it will be necessary to provide for extension of activities to include investigaton of sea bass, croakers, summer flounders, winter flounders, bluefish, shad, and striped bass.

The need for unified or coordinated administration arises from the migratory habits of the fish, and from the interstate traffic in the products of the fishery.

Squeteague.—The more important features of squeteague life history and certain conservation considerations based on them have been presented in earlier reports of this series. For convenience these are summarized as follows:

(1) Squeteague spawn in inshore waters from Massachusetts to North Carolina in late spring and early summer, but there is considerable doubt as to whether there is significant survival from spawning north of the coast of Virginia.

(2) Nearly all squeteague spend their yearling summer south of Delaware Bay, so that that portion of the range constitutes a nursery area in which yearling squeteague predominate in the catches, while the area north of Delaware Bay is frequented by 2-year-old fish or older—the survivors of the southern fishery for yearlings.

(3) Squeteague grow much more rapidly north of Delaware Bay than in southern waters.

(4) The decline in numbers of large squeteague in the Middle Atlantic States, especially in northern New Jersey and New York, has not been caused by excessive fishing locally but by increased fishing for yearlings in the southern nursery areas.

(5) The southern fishing for yearlings involves the capture and destruction of some squeteague too small to be marketed. In the report for 1934 it was recommended that experiments be undertaken to determine whether the waste of undersized squeteague could be mitigated or eliminated by changes in the design of pound nets.

In 1935, R. A. Nesbit actively engaged in, or directed (1) a preliminary survey by W. C. Neville of pound net fishing methods in Virginia and North Carolina to observe further the extent of waste of small fish and to secure a basis for planning the experiments referred to above when resources become available; (2) further examination of scale and length-frequency data, including samples taken by Mr. Neville in the southern survey. The results of these activities are discussed separately below.

In Pamlico Sound, N. C., Mr. Neville found conditions in early July very similar to those reported by Higgins and Pearson[4] for 1925. Eight random samples totaling 1,164 squeteague were taken at the nets. Of these, 308, or 26.5 percent, were below legal size. Since squeteague of barely legal size are not desirable, some squeteague slightly longer than 9 inches were discarded so that approximately 30 percent of the catch was not utilized at the time and in the locality covered by observations. In Chesapeake Bay 16 random samples totaling 1,610 squeteague were taken in later June. Of these, 118, or 7.3 percent, were below the legal minimum. From traps set in the ocean near Hog Island and off Virginia Beach, Va., 14 random samples totaling 1,806 squeteague were secured. Of these, only 45, or 2.5 percent, were undersized.

In 1929, when extensive series of samples were secured from the traps in Chesapeake Bay and from those near Hog Island, the waste of undersized fish was negligible. In that year it was also noted that yearling squeteague did not appear in the Virginia catches until August, when most of them were above the legal minimum. It is probable, therefore, that waste of undersized squeteague seldom, if ever, reaches very large proportions in Virginia.

In the Pamlico Sound region of North Carolina, however, waste of small fish, especially in the early summer months, appears to be of considerable magnitude. Of especial interest, therefore, is the observation (based on examination of the circulus spacing on the scales) that more than half of the 1935 yearlings consisted of squeteague which had spent the latter part of the preceding summer north of Delaware Bay. If these fish had survived, most of them would have returned to the North in 1936. It is apparent, therefore, that the conditions described by Higgins and Pearson in 1925 and the recommendations made by them are of more than local significance.

Further examination of northern scale collections indicates that there are two groups of squeteague in the Middle Atlantic region. The first of these appears as 2-year-old fish in southern New Jersey after having spent their yearling summer in the South. Although some of these fish continue to return to southern New Jersey in succeeding years, most of the survivors of the southern New Jersey fishery spend their summers in northern New Jersey and western Long Island, N. Y., when 3 years old or older. Since the fishery in southern New Jersey has increased during the last 15 years, the increased mortality among 2-year-old squeteague of this group has undoubtedly contributed to the diminution in numbers of large squeteague in northern New Jersey and western Long Island. Restriction of the fishing in southern New Jersey would probably be of little benefit, however, for the 2-year-old fish produced there compete in the markets with the Virginia and North Carolina yearlings. Elimination of these fish from the market would stimulate the southern fishery toward a still heavier toll of yearlings, perhaps resulting in a still further decrease in abundance in northern New Jersey.

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[4] Higgins, Elmer, and J. C. Pearson. Examination of the summer fisheries of Pamlico and Core Sounds, N. C., with special reference to the destruction of undersized fish and the protection of the gray trout, *Cynoscion regalis* (Bloch & Schneider). Bureau of Fisheries, Document 1019, 1927.

The second group appears as 2-year-old fish in eastern Long Island, N. Y., after having spent their yearling summer in the South. Many of these fish continue to return to this locality in succeeding years, but it is possible that the large squeteague occurring in southern New England belong to this group. This eastern Long Island group differs from the New Jersey-western Long Island group in that it provides larger catches in the spring and early summer than in autumn, while in New Jersey the reverse is the case. This suggests an explanation of the invasion of New York and southern New England[5] by remarkable numbers of large squeteague 30 years ago. All accounts agree that these large fish were not preceded by exceptional numbers of small fish, and in eastern Long Island, at least, it is known that they were present only in late summer and autumn, the spring catches having been actually smaller than those of the years preceding and following the run of large fish. Hence, it appears that this phenomenon was the result of a temporary extension of the range of the New Jersey-western Long Island group.

From the foregoing it is apparent that the problem of squeteague conservation presents quite different aspects according to the point of view from which it is examined. From the point of view of the commercial fishermen and anglers of New York and New Jersey, all fishing for squeteague south of Delaware Bay is disadvantageous. From the point of view of southern fishermen, it is probable that little or nothing is to be gained by protection of yearlings after they have reached marketable size. For growth is so slow in southern waters that it is very doubtful whether the growth of those yearlings which remain in the South compensates for the losses from natural mortality and from emigration to northern feeding grounds. If the problem be considered from a national rather than from a sectional point of view, it must be admitted that insufficient data are available to permit a decision as to whether sufficient benefit would result from curtailment of the southern catch of yearlings to compensate for the resulting losses.

The more important items of gain and loss can be listed but their magnitude cannot be estimated closely at present. The principal gain would be an increase in abundance of squeteague in New Jersey and New York. Since these would be medium and large squeteague which bring better prices than small sizes, the gain in value would be even greater than the gain in pounds. Increased abundance of the larger sizes which frequent the waters of northern New Jersey and New York would improve angling conditions and the important business of catering to anglers would be stimulated. Against these gains must be set not only the loss to the southern fishery of the squeteague protected there, but the losses due to curtailment of the catch of other species as well, for most squeteague are taken in pound nets which also take considerable quantities of other species not all of which appear to need protection.

Even if it could be shown beyond doubt that the greatest good to the greatest number could be accomplished by curtailment of southern fishing, there exists no practical means of accomplishing such a curtailment, for control of the fisheries in territorial waters is vested in the several States. Experience has shown that local interests are considered first when conservation measures are proposed. It is not to be expected, therefore, that the individual States will adopt conservation measures other than those likely to benefit the local fisheries.

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[5] Bigelow, H. B. and W. W. Welsh. Fishes of the Gulf of Maine. Bulletin, U. S. Bureau of Fisheries, vol. 40, pt. 1, 1924 (1925).

However, all sections can endorse the proposal to seek a practical means of preventing the destruction of squeteague too small to be marketed; but until funds are made available, the necessary observations and experiments cannot be undertaken.

Scup.—Investigation of this species was continued by W. C. Neville. Catch records of the summer fishery in 1934 were compiled and analyzed, observation of the winter trawl fishery was continued, and progress was made on a comprehensive report dealing with the life history and the conservation requirements of scup.

Attention has been focused on observation of the effects of the increased exploitation to which scup has been subjected in recent years. Most of this increase is due to the winter fishery, the scup catch of which has more than doubled since 1931 (rising from approximately 1,686,000 pounds in that year to 3,844,000 pounds in 1935). To a large extent the increases are due to the greater numbers of vessels engaged in the fishery. It is difficult to measure changes in abundance closely, for the catch of each of four species, scup, sea bass, fluke, and croakers, is influenced greatly by variations in availability due to changes in hydrographic conditions, and by varying market preferences. Everything considered, however, it appears that abundance has remained high or even increased somewhat in spite of the increased fishery.

Nor has there been, thus far, indication of diminution in the average annual increments to the stock. Continued high yields from the New Jersey summer pound-net fishery, in which the younger-age groups predominate, indicate that most recent spawnings have been very productive. In the winter fishery also, the younger age groups have been well represented. Of the year classes since that of 1926, only the 1929 and the 1933 year classes have been below average.

There is no need to reduce the catch of scup in order to increase the numbers of spawning adults. The annual increments of young are extremely variable, and to a very great extent are independent of the numbers of spawners. For example, the abundant 1927 and 1928 year classes were produced in years in which the numbers of spawners were relatively small, but in 1933, when spawners were very abundant, spawning was comparatively unproductive. The results of tagging experiments also suggest that the present catch of adult scup does not cause excessive reduction of scup of spawning age. In no case has the percentage of tags returned exceeded 3 percent. Since returns from squeteague, flounder, cod, and striped bass experiments range from 10 to 30 percent, it appears that the scup fishery imposes a much smaller strain on the spawning stock.

Although the present catch of marketable sizes of scup is not excessive, present methods of fishing cause considerable waste of scup too small to be marketed. This necessarily reduces the abundance of marketable scup in subsequent years, thereby increasing the costs of catching them. Because of lack of funds, it has not been possible to devise practical savings gear to permit the escape of the unmarketable sizes.

FISHERY INVESTIGATIONS OF THE SOUTH ATLANTIC AND GULF COASTS

SHRIMP

MILTON J. LINDNER, *in charge*

As in preceding years, excellent cooperation in the investigation of the natural history and abundance of the shrimp has been furnished by the Louisiana Department of Conservation, the Texas Game, Fish and Oyster Commission, and the Georgia Tidewater Department. Offices and laboratory facilities have been supplied by the Louisiana Department of Conservation, the Georgia Tidewater Department, and the San Patricio Canning Co. Headquarters have been maintained in New Orleans and field stations were located at Beaufort, N. C.; Brunswick, Ga.; and Aransas Pass, Tex. During the spring of 1935 John C. Pearson was transferred from New Orleans, La., to St. Augustine, Fla., to continue his studies on the eggs and larvae of the shrimp.

The common shrimp, *Penaeus setiferus*, because of its outstanding dominance of the fishery, has received most of the attention of the investigators. At least 95 percent of the shrimp catch is composed of individuals of this species.

Shrimp still ranks preeminent among the sea foods of the South, and the shrimp fishery with an annual catch of approximately 100,000,000 pounds is one of the major fisheries of this country. Results of studies in 1935 have shown that this fishery undergoes sharp fluctuations. Shrimp were exceedingly scarce in the spring and early summer of 1935. In spite of this scarcity, which was general throughout the entire South Atlantic and Gulf, the late summer and fall fishery proved to be relatively successful in most localities. The Georgia and Florida fall fisheries in particular were much improved as compared with the previous several years. On the other hand, in some localities, particularly Corpus Christi Bay, Tex., the fall catch has been much less than expected. These fluctuations indicate that definite changes in the magnitude of the shrimp population do occur, and that for a complete understanding of the fishery a study of these changes must be made, their nature and causes determined, and the effect the fishery has upon them ascertained.

Such studies are complicated by the fact that the shrimp fishery is not established at a constant level, but is marked by a continual expansion and increase in fishing effort, which has been particularly evident along the South Atlantic coast. More and larger boats drawing larger nets, introduction of Diesel power, and the conversion of gasoline engines to the use of cheaper fuel have all contributed toward this increase. Consequently it is of vital importance that the proper type of statistical system be introduced as soon as possible in order that the trend of the abundance of the fishery be followed, the fluctuations of supply determined, and an understanding of their causes secured. Due to the constantly increasing effort it is impossible, with the present inadequate records, to secure an estimation of the fluctuations. Since the shrimp fishery extends over practically the entire coastal area of eight Southern States, it is impossible for the present staff to gather these statistics in the detail in which they should be secured.

Sexual maturity.—At Beaufort, N. C., Dr. J. S. Gutsell completed his studies of the structure and development of ovaries and ovarian eggs of the commercial species of shrimp and is finishing a report on his findings. This investigation has shown that in the Beaufort region the common shrimps in many instances probably spawn at least twice during the spawning season. Spawning at Beaufort is most active in May, but continues throughout the summer and a large part of the autumn. It seems probable that some of the shrimp in this vicinity may survive through two winters and spawn during the second year. In any event, the numbers which spawn in their second year appear to be exceedingly few. Definite criteria have been found for mature and spent ovaries.

Food.—Since the completion of the ovarian studies Dr. Gutsell has been engaged in determining the food of the shrimp and has examined the contents of hundreds of stomachs of the common shrimp, *P. setiferus*, and the grooved shrimp, *P. brasiliensis*, including a considerable number from young of 1 to 3 inches in length. In addition, shrimp have been kept in aquaria and fed various foods. Fish, shrimp, and oysters were readily eaten, but an apparent preference seemed to be shown for small barnacles. The stomach contents indicate that the principal natural diet appears to be small crustacea (such as Cumacea) and polychaete worms. Both these forms are generally found burrowing in mud or sand, where they are apparently readily found by the shrimp. Mollusks, barnacles, fish, plants, and plant material, including diatoms, small filamentous algae, pieces of tissue from higher plants, and sand are also found in the stomachs of the shrimp.

Since the variation in food supply may vitally affect the abundance and distribution of shrimp, it is a subject which cannot be neglected in the present study, and which may give an important clew to the causes of fluctuation in the shrimp fishery.

Weight-length.—In Texas, Kenneth H. Mosher has continued the sampling of the commercial catches during 1935. A total of 9,773 shrimp were measured and examined for stage of sexual maturity. Of this number, 5,435 were from Aransas Pass, 4,038 were from Galveston, and 300 were from Port O'Connor. The relative importance of *P. setiferus* is indicated by the fact that of all the shrimp examined throughout the entire year over 98 percent were of this species. In addition to the length measurements, Mr. Mosher weighed 4,200 shrimp in order to obtain an extensive list of data from which to compute the weight-length relationship. These data show that seasonal differences occur in the weight-length relationship, and may, therefore, throw light on various questions concerning shrimp biology; for example, on whether or not overcrowding of the population exists. This study will therefore be continued.

Larvae.—Our understanding of the life histories of the two commercial shrimp, *P. setiferus* and *P. brasiliensis* and other peneids has become more clarified during the past year by the recognition of the early growth stages of both species by John C. Pearson who has been stationed at St. Augustine, Fla. From living and preserved material these species of shrimp have been traced through the egg, nauplius, zoea, and mysis stages of development. It was essential that the eggs and young be distinguished before any clear-cut conception of their early life histories could be possible. It is interesting that the peneids undergo more molts and stages of growth than any other group of decapod crustaceans. Nevertheless probably no complete series of larval forms has yet been traced out for any single species of the *Penæidae*. The present studies on eggs and young of these commercially important shrimps not only establish the distinctive morphological features during larval life, but also contribute significantly to our knowledge of the spawning season and the distribution of the young.

Observations at St. Augustine and Fort Pierce, Fla., have proved definitely that many eggs and planktonic young of these two species of commercial shrimp come into the shallow estuarian rivers and lagoons from the ocean through the various inlets. The spawning season along the Georgia and Florida coasts, as previously indicated by examination of ripe adults, extends at least from March into September for the common shrimp, and probably throughout the year for the grooved shrimp, which appears to be a more characteristically offshore and deeper water species.

During the coming year intensive study will be made on the living eggs and young of these southern shrimps to ascertain among other things the rate of development at various stages, the rapidity of the natural movement of young, and the possible factors influencing mortality.

Migrations.—Regular sampling of the shrimp population along the South Atlantic coast aboard Fisheries Launch *58* was continued by W. W. Anderson for the first 6 months of 1935. The territory covered extended from Cape Romain, S. C., to Cape Canaveral, Fla. As in previous years, nine outside and two inside stations were visited regularly once each month. The particular area covered represents by far the greater portion of the shrimp-fishing localities on the South Atlantic coast. The stations were so established as to be from 35 to 50 miles apart and to cover the more important fishing centers along the coast, in this way giving us a fairly representative sample of the entire fishery. At each station at least two hauls of ½-hour duration each were made with a 50-foot otter trawl. Plankton tows were made and water temperatures and salinities recorded for every station. Shrimps from each haul were measured and the stages of gonad development observed. All fishes taken in the hauls were recorded as to species and numbers. During the last 6 months of the year such sampling was discontinued in stations north of Brunswick, Ga., but maintained from Brunswick, Ga., to Cape Canaveral, Fla.

As mentioned in the previous annual report, the data gathered aboard Launch *58* indicated quite definitely that a migration of shrimp occurs along the South Atlantic coast. During the fall and winter of each year it was observed that large shrimp disappear from the Georgia coast. At the same time an important fishery for such large shrimp developed off the central Florida coast from St. Augustine to Cape Canaveral. These two facts suggested four possible explanations; namely: (1) A southern migration into Florida of the larger Georgia shrimp during the fall and winter. (2) Depletion through fishing of the large Georgia shrimp, while the Florida fishery was maintained by natural growth of native shrimp. (3) A winter offshore movement in Georgia of the more developed shrimp. (4) A combination of any two or all three of the above possibilities. The regular and recurrent nature of these phenomena leads us to believe that migration is probably the most important factor influencing them.

Measurements were made by Mr. Lindner in an attempt to determine whether or not differences in body proportion existed which would make possible the identification of shrimp as to point of origin. It was found that although racial differences do seem to occur in the shrimp, possible intermingling and probable seasonal and environmental changes in body proportion have made it impossible to interpret these data without experimental studies.

Tagging experiments were conducted on confined shrimp at Aransas Pass, Tex., by Mr. Mosher and Mr. Lindner in order to determine the feasibility and best means of marking. These experiments showed that the celluloid disc type of tag affixed to the first abdominal somite of the shrimp was most probably the best method as it apparently interfered less with movements and molting, and was retained better than other devices. During September, October, and November this method was placed in practice in the field by Mr. Lindner and Mr. Anderson. A total of 3,800 shrimp were tagged along the Georgia and Florida coasts.

The success of this method of tagging is evidenced by the fact that by the end of December almost one-fourth of the tagged shrimp had been taken by the fishermen and returned to the investigators. Although these experiments are by no means completed it is quite evident that there does occur a southward movement of shrimp from Georgia into Florida during the fall and winter. Some of the tagged shrimp had moved distances upwards of 200 miles. The success of the Florida winter fishery probably thus depends to a large extent upon the production of shrimp in Georgia, and upon these shrimp escaping the Georgia fishermen. The numerous returns indicate that the fishery is very intense. The importance of continuing these studies is obvious.

During the coming year tagging operations will be extended throughout the entire area of the South Atlantic shrimp fishery in order to determine whether there is a return movement of shrimp from Florida to Georgia in the spring, and also to discover the direction and extent of the migrations along the North and South Carolina coasts. Data have been collected which indicate that there may also be a winter concentration of shrimp in the vicinity of Cape Hatteras. In addition, arrangements have been made for securing a pond in the vicinity of Brunswick, Ga., where experiments can be conducted to determine the mortality owing to tagging. From these experiments, and from the tagging returns it is hoped that some conclusions can be derived as to the actual intensity of the fishery.

It is evident from data gathered in Louisiana and Texas that the Gulf shrimp also are migratory. Throughout the fall and winter it is customary for the majority of large shrimp to disappear from the usual coastal fishing grounds. Evidence has been secured which leads to the belief that during the winter the shrimp move offshore to the deeper and warmer waters of the Gulf. With suitable vessel equipment, which this investigation does not now possess, it should be possible, through extensive fishing during the fall and winter in the offshore waters, to determine whether or not this is the case and also whether or not the shrimp congregate in sufficient quantities in these areas to make a commercial fishery feasible at this time.

In Texas during the coming year, if arrangements can be made, intensive tagging experiments will be conducted over the entire fishing area. It is hoped through marking experiments to be able to determine the intensity of fishing, particularly in Corpus Christi Bay. It is also probable that at the same time valuable data will be secured on the coastal or offshore movement of the Texas shrimp.

GREAT LAKES FISHERY INVESTIGATION

John Van Oosten, *in charge*

As in 1934, virtually no field work was conducted on the Great Lakes during the calendar year 1935. F. W. Jobes spent 1 week in February at Put in Bay, Ohio, obtaining a collection of young perch from the Ohio Division of Conservation, and Dr. Van Oosten spent 1 week in July at Port Huron, Mich., observing the whitefish catch in deep trap nets with special reference to the percentage of undersized fish taken in waters less than 80 feet deep.

The Bureau maintained its cordial relations with the various Great Lakes States, and provided considerable assistance in drafting and revising fisheries legislation and submitting pertinent data. Ohio submitted 5 bills affecting commercial fisheries; Michigan, 13; and Wisconsin, 12, one of which involved the complete recodification of its laws governing the Great Lakes fisheries.

Dr. Van Oosten represented the Bureau at 10 conferences and meetings during the year, and at some of these presented papers.

FISHERY STATISTICS

A major project undertaken without benefit of precedent was the initiation by the Bureau of Fisheries in 1933 of a detailed statistical study of the Great Lakes fisheries in waters under the jurisdiction of the State of Michigan, based on reports of daily fishing activity submitted at the end of each month by all licensed fishermen represented. The Great Lakes fisheries present so many peculiarities that the statistical methods employed in the study of other fisheries are, in general, not applicable. The consequent necessity for the development of special methods adapted specifically to the investigation of Great Lakes fisheries made it imperative that the first analyses and tabulations of statistical data be carried out in the minutest detail. The task was made the more onerous by reason of the fact that the compilation of the statistics of 3 earlier years (1929–32) had to be made in addition to that of the statistics of the current year. The basic tabulations of statistical data have now been completed for all Great Lakes waters under the jurisdiction of the State of Michigan for the 6-year period, 1929–34. In addition, detailed statistical summaries for the different calendar years have been prepared for the Michigan waters of Lake Huron, Lake Erie, and Lake Michigan for the same period.

Progress in the statistical study of the Great Lakes commercial fisheries during 1935 has by no means been limited to bringing tabulations of original data up to date. The modification of methods of procedure, and the detection of sources of error have added much to the reliability of the statistical results. As an illustration, it may be mentioned that the original geographical boundaries of some of the statistical districts proved unsatisfactory and had to be revised. A more unusual difficulty was that presented by the discovery of numerous misstatements relative to the type of gear employed. A serious distortion of the statistics of the fishery (particularly the whitefish fishery) was avoided only by means of a detailed study, requiring several months, of the fishing activities from month to month of individual fishermen and individual vessels. Conclusions drawn from these studies were carefully substantiated from other sources.

Attention has been directed also toward the critical examination of the basic assumption and definitions upon which the original methods of procedure were founded. In this connection the observations on the relationship between fishing time of stationary gear and size of lift are particularly striking. Doubling the amount of time that gear is fished before it is lifted does not double the catch, but on the average increases it only 10 to 20 percent. This relationship together with the fact that the average fishing time for a given type of gear fluctuates within narrow limits from year to year in a single fishing area may make it possible to dispense entirely with fishing time in the treatment of statistical data. Certainly the earlier definition of the "catch per net per night" as the most discriminating measure of abundance will require modification.

In order that annual fluctuations in the abundance of each species in a given area may be expressed more concisely, effort is being directed toward the development of a method of expressing these fluctuations in terms of index numbers. The index number is derived through the comparison of the actual catch of a given species for a given year and in a certain locality with the "expected" catch as computed from the known intensity of the fishery.

PIKE PERCHES

A manuscript dealing with various phases of the economics, life histories, and racial affinities of the pike perches (Stizostedion) of Lake Erie has been partially completed by H. J. Deason. Many conclusions resulting from this investigation have been presented previously in Progress in Biological Inquiries for the years 1933 and 1934. Additional conclusions have been reached in 1935.

The male and female saugers grow at approximately the same rate for the first 3 years of life while in the yellow pike perch, the same relative growth rate extends through the first 4 years of life, following which the females of both species grow more rapidly than the males.

A mathematical expression of the length-weight relationship in terms of the formula $y = ax^n$ has been obtained for each of the three species; namely, sauger, yellow pike perch, and blue pike perch. The weight of each species tends to increase approximately as the 3.15 power of the length. (A slightly different value was obtained for each of the three species.) The "relative heaviness" or "state of well-being" of the pike perches, as expressed by a coefficient of conditions, K, obtained by the formula

$$K = \frac{W.10^{-5}}{L^3}$$

has been found to vary with the length of the individual, with sex, and according to the season of the year. No variation with respect to locality was found.

A history of the pike-perch fishery of Lake Erie has been completed. Sources include publications of various United States and Canadian agencies as well as valuable unpublished records obtained from certain commercial fishermen of Lake Erie.

YELLOW PERCH

Virtually all of the available data collected during the years 1927–32 on the age and growth of the yellow perch have been drawn up in summary tables. The growth data (lengths and increments), based largely on the measurements of scales, have been analyzed with respect to age groups, year classes, sex, and localities. Age composition of the commercial catch has been ascertained with respect to both seasonal fluctuations and locality. Individual weights of approximately 18,000 yellow perch have been tabulated by 5 millimeter frequency intervals and have been subjected to analysis with respect to type of gear, size of mesh, seasons, sex, sexual maturity, and locality. Length frequencies were compiled to show variations with respect to gear, seasons, and locality. The work on the yellow perch was discontinued in June when F. W. Jobes was transferred to the Washington office.

CURRENT PROJECTS

Current projects involve largely the writing of reports covering the major investigations completed in the field. Such projects include the 5-year investigation on Lake Erie; the 2-year survey of deep trap net operations on Lakes Huron and Michigan; the three seasons' work on the chub nets of Lake Michigan, including studies on temperature and currents; and life histories of the whitefish of Lakes Huron and Erie, the cisco of Lake Erie, the sheepshead of Lake Erie, the chub of Lake Superior, and the herring of Lake Huron.

PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

FREDERICK A. DAVIDSON, *in charge*

The Pacific coast and Alaska fishery investigations were confined mainly to studies of the salmon fisheries in the Pacific Northwest States and the salmon and herring fisheries of Alaska. The major investigations of the salmon and herring fisheries conducted in these regions in 1934 were continued during 1935. In addition, a new and much-needed investigation dealing with the collection and statistical analysis of daily catch records of the various types of fishing gear used in the salmon fisheries of Alaska was carried on in 1935.

COLUMBIA RIVER

The investigation of the fisheries of the Columbia River was conducted during 1935 by J. A. Craig, assisted by A. J. Suomela. The activities of this investigation can be summarized under several divisions, each forming a part of the general program for the acquisition of facts essential to the preservation of these important fisheries.

One of the phases which is of fundamental importance is the study of the annual and seasonal fluctuations in the abundance of the important species of fish contributing to the Columbia River fisheries. These fluctuations are being ascertained from a statistical study of the catch records of individual pieces of gear employed in the commercial fishery. Records have been made available through the cooperation of the commercial fishing interests on the river, and some of them extend back as far as 1897. All of the original records of the catches of all important commercial species, namely, chinook, blueback, chum and silver salmon, steelhead trout, and sturgeon, made with gill nets, traps, and seines, have been copied from 1897 to 1934, inclusive. Since the chinook salmon are by far the most numerous and important species frequenting this river system, indexes of their abundance are being computed first. Practically all of the gross tabulations and summaries of these data have been completed within the year.

Another major division of this investigation is the stream survey program. The object of these surveys is to obtain data which will be a guide to the improvement and rehabilitation of the spawning areas in the Columbia River system.

In the course of this work field parties secured information on (1) the total area in each tributary which forms the present and past spawning areas for migratory species of fish; (2) the location of the spawning areas now available to salmon; (3) the location of the areas which have been made unavailable to salmon, and the cause of their destruction; (4) the sources of pollution which may be detrimental to spawning populations of salmon and to resident fingerlings; (5) the number and location of irrigation canals and their effect on migratory fishes; (6) the location of natural and artificial obstructions, and the extent to which these form barriers to upstream migrants; (7) the general status of the salmon populations in the Columbia River.

During the present year, 1935, the survey has progressed satisfactorily, especially so from the advent of summer to the close of the year. The activities have been concentrated principally in eastern Washington on tributary streams below Grand Coulee. The streams on which surveys have been completed are: Methow, Entiat, and the Wenatchee. The Okanogan has been partially surveyed. In the Yakima system the tributaries examined to date are as follows: Naches River with its tributaries, namely, American River, Bumping River, Rattlesnake Creek, and Tieton River; and Ahtanum Creek, Satus Creek, Kachess and Cle Elum Rivers, which empty directly into the Yakima River. In the southeastern section of the State of Washington partial surveys of the Walla Walla River, Mill Creek, and Asotin Creek have been made, and the examination of the Touchet and Tucannon Rivers is finished. Surveys of Alochoman and Wind Rivers in the lower Columbia are under way, while the Washougal River survey was completed. A total of 1,100 miles of tributary streams was surveyed during the year.

Because of the fact that all of the salmon and steelhead trout which reach Grand Coulee Dam after its completion must be artificially spawned and their offspring cared for in a hatchery, it became necessary to know the numbers and species of these fish migrating past the dam site so that proper hatchery facilities could be provided for them. In connection with this problem, counting weirs were installed in both fish ladders of the Rock Island Dam of the Puget Sound Power & Light Co. Observers were stationed there to count the fish during the entire year. The total numbers of salmon and steelhead trout passing over this dam in 1935 were: Chinook salmon, 16,310; blueback salmon, 14,013; silver salmon, 11; and steelhead trout, 5,412. This counting was done in cooperation with the Washington State Fisheries Department.

A counting weir was maintained in the fish ladder of the Tumwater Dam on the Wenatchee River during the late summer and early fall when the blueback salmon were ascending that tributary. During that time 889 blueback salmon, 4 chinooks and 7 steelheads ascended the ladder. Another counting weir was operated at Oroville, Wash., where 10 chinooks and 264 blueback salmon were counted. From surveys made of spawning grounds, records of the Indians' catches at Kettle Falls, and other sources of evidence, it appears that the majority of the fish counted over the Rock Island Dam go on past the Grand Coulee dam site and seek spawning grounds largely in British Columbia. Fortunately, a great deal of work on the life history and habits of the salmon of the Columbia has been done (by Rich, Holmes, and others) thus making that phase of the investigation seemingly less pressing than some of the others. However, every opportunity was taken advantage of to secure material for such work. Large collections of the migrants, both salmon and steelheads, were made in the Yakima River, and scales were taken from steelheads and salmon at the Rock Island and Tumwater weirs.

The investigation of the mechanism of the homing instincts of the blueback or sockeye salmon, initiated before Mr. Craig was transferred to the Columbia River work, was continued. Ten thousand sockeye migrants in their second year were marked and liberated in Diobsud Creek, a tributary of the Skagit River, as a check on the extensive marking experiments of 1934 in that system. The first returns from these experiments are expected in the fall of 1936.

In order to have a complete understanding of the fishery problems of the Columbia River system, it has been necessary to do a considerable amount of research on the history and development of these fisheries, and on the development and utilization of other natural resources such as water power, agricultural land, and forests which have influenced the fish populations by bringing about changes in their habitats. A report on this part of the investigation is now in the process of preparation.

As a result of cooperative work between the United States Bureau of Fisheries and the Washington State Fisheries Department, evidence was collected and presented which indicated the necessity for a third fish ladder at the middle of the Rock Island Dam on the main Columbia River. This ladder is now being constructed and will be in use during the summer of 1936.

PUGET SOUND SOCKEYE SALMON

Since the publication in March 1935, of the preliminary report on the salmon fisheries of the Puget Sound-Frasier River region by Dr. George A. Rounsefell and George B. Kelez, entitled Abundance and Seasonal Occurrence of the Salmon in the Puget Sound Region and the Development of the Fishery,[6] the sockeye investigation has been concerned largely with obtaining sufficient data to clarify many of the points only hinted at in the preliminary study. The collection of statistics on the catches of fish traps and seines in Puget Sound was continued in cooperation with the coho investigation. Special efforts were made to obtain sufficient purse seine data covering the fall months, and considerable success was achieved.

The records of daily catches were obtained for over 76 percent of the salmon traps operated during the past 20 years, and a considerable percentage of all of the traps operated since 1895. These data are being tabulated so as to show the seasonal occurrence of all species of salmon in each of the main fishing areas. Furthermore, the total annual catches made by each of the traps since 1915 have been ascertained, thereby making available the quantities of salmon taken in each area.

The sockeye investigation has obtained records of individual daily catches by gill nets on the Fraser River of all species of salmon throughout each season from 1898 to 1935. Preliminary analysis of these data has shown distinct differences in the efficiency of Japanese, white, and Indian fishermen. Records have been obtained of all the licenses from 1900 to 1935, and these are being studied to discover the variations in numbers of each of these three classes of fishermen.

The Division of Fish Culture has cooperated with the sockeye investigation by planting 76,000 fingerling sockeyes from the Birdsview hatchery in Cedar River, a tributary of Lake Washington; and another 76,000 in Issaquah Creek, a tributary of Lake Sammamish, which empties into Lake Washington through the Sammamish River. These two lakes appear to be the most suitable in the Puget Sound region of the State of Washington for the establishment of sockeye salmon. At present they both support runs of coho salmon.

During the 1935 season biological data were collected from the commercial catches of sockeye, pink, and chum salmon from various areas within Puget Sound as well as from Swiftsure Bank. From July 22 to November 20, scales and length measurements were taken on 55 samples of sockeyes comprising 2,529 fish. Weights were taken on 2,229 of these. The same data were obtained on 1,430 chum salmon in 36 samples. Length and weight data were taken on 830 pink salmon in 17 samples.

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[6] Special Report, Washington, 1935 (multigraphed).

Considerable attention has been given to tracing the early history of the fishery so as to be able to utilize past experience on the effect of the fishery on each species in deciding what effects to expect in the future.

WASHINGTON COHO SALMON

The coho salmon investigation on Puget Sound, the purpose of which is to determine the life history of the species, changes in its abundance together with their underlying causes, and methods of rehabilitating population in streams now barren or depleted, was continued during the past year under the direction of George B. Kelez.

A continuous series of fingerling collections was made in McMillin Creek to determine the rate of growth of the fish from the time of hatching until the time of seaward migration. Because of differences of temperature as great as 10° C. between various streams of the region at the same time in the summer, a series of samples was taken from all major streams and tributaries during the last week in June. A preliminary analysis of this material shows a size range from 34 to 59 mm with a mean of 40 mm in the colder streams, and a range from 48 to 71 mm with a mean of 60 mm in the warmer ones.

Two marking experiments were undertaken this season on Voight Creek, a tributary to the Puyallup River, in the southern part of the region. The fingerlings used were provided through the cooperation of the Washington State Department of Fisheries. In the first experiment, 50,000 fingerlings reared from eggs taken in November and hatched during February 1934 were marked by the removal of the dorsal and right ventral fins. The fish marked each day were held 24 hours to determine any loss due to handling and were liberated in the stream. This marking was carried on during the period from May 13 to May 19, 1935. For the second experiment, 25,000 fingerlings of the same age hatched and reared at the State hatchery on the Green River were moved to Voight Creek and marked by the removal of the adipose and both dorsal fins. The lots of fish marked each day were held for 24 hours in the stream and then liberated. This experiment was carried on between May 28 and June 3, 1935.

The first experiment is expected to furnish information on certain phases of the life history of the coho salmon such as the "homing instinct", migration routes, and time of appearance of this particular run, through recoveries of adult fish both from the commercial fisheries and from the stream itself during the spawning run. The second experiment is intended to determine the success of transplanting coho salmon of the fingerling size in a stream entirely separate from that of their nativity. Adult fish resulting from the fingerlings transplanted to Voight Creek must pass the mouth of the more northerly Green River, their native stream, before reaching the mouth of the Puyallup. If the tendency is to return to the Green River they will be taken at the hatchery rack there; the proportion returning to the Puyallup will indicate the success of transplanting fish of this size.

The first recoveries from a similar set of experiments carried on in 1934 at the Samish River, in the northern region of the Sound, were made during the spawning migration of the present season. Six of these fish, returning as grilse from the marking of November 1934, were recovered with a dip net at the Samish rack. One was reported as taken by a sport fisherman below the rack, and several others escaped, being small enough to pass through the rack. No returning grilse were observed from the earlier Samanish experiments, those of May 1934.

Collections of biological data from both commercial and sport fisheries were made throughout the season. Scale samples and data as to length and sex were taken for over 3,000 fish obtained from the commercial fishery between July 22 and November 20, when the fishing season closed. Weights taken from 2,700 of these fish indicated an exceptional growth during the third year of their lives. Scale samples and measurements were also obtained from several hundred fish in their second year taken by sport fishermen.

The collection of data was continued on individual catches by all types of gear on Puget Sound since the beginning of the fishing industry there. Almost all the material of this nature still in existence has now been obtained from the records of the industry. This is being analyzed to determine changes in abundance, time of runs and the importance of the various fishing areas.

KARLUK RIVER RED SALMON

An investigation of the red salmon runs of the Karluk River, Alaska, was continued by J. T. Barnaby, assisted by L. D. Townsend and J. F. Hart.

Another marking experiment was initiated, 49,092 seaward migrants being marked by the amputation of the left ventral and adipose fins. The returns from various marking experiments have ranged from 20 to 25 percent of the migrants marked. Thus the ocean mortality from seaward migrant stage to adult stage is apparently about 75 percent. If we assume the return of only two adults for each spawner, the assumption upon which the existing statute limiting the commercial catch to 50 percent of the total run is based, and if we assume that each female produces the known average of 3,500 eggs, the mortality during the fresh water period, or from eggs to seaward migrants may be calculated under these conditions to be 99.54 percent.

Since the greatest mortality of this species takes place during the fresh-water period of its life history, further studies were made on the environmental factors which influence the success of each year's spawning. Physical and chemical data were collected throughout the summer. The chemical analysis of the lake and stream waters indicates that phosphorus and silicon are limiting factors in the production of plankton, at least during the major part of the summer. The water of the streams entering the lake contained on the average 2 one-hundredths of a milligram of phosphorus per liter, and over 8 milligrams of silicon per liter. The phosphorus content of the lake water during June, July, and August remained at zero and the silicon content of the lake water was 1½ milligrams per liter in June, a trace in early July, zero in late July, and a trace in August. Thus the phosphorus and silicon were being used up as fast as they became available to the phytoplankton in the lake. Samples taken on September 6 showed 6 one-thousandths of a milligram of phosphorus, and one-half a milligram of silicon per liter. Plankton samples showed less plankton in the water than was present earlier in the summer. Thus some other factor, probably the amount of light, was acting as a limiting factor at this time, and was allowing the gradual accumulation of phosphorus and silicon in the lake water.

Other fish inhabiting this lake naturally have some effect on the population of young red salmon. Present in the lake are young silver and king salmon, a small population of young steelhead trout, cottoids, sticklebacks, and Dolly Varden trout. It is considered that only the two last-named species may have an important effect on the survival of the red-salmon fingerlings. The sticklebacks, due to their abundance, are possible competitors for food, and the Dolly Varden trout are predators. Dolly Varden trout were caught in a gill net, at all depths down to 52½ meters (175 ft.). Salmon eggs were found to be present in the stomachs of trout taken in depths down to 46 meters (151 ft.) indicating that these trout alternate between shallow and deep water in a relatively short period of time, or else that red salmon may spawn in deeper water than previously supposed. Adult red salmon were taken in the net in depths down to 41 meters (134 ft.) and appeared to be quite abundant in depths down to 24½ meters (80 ft.). Of the trout caught between July 19 and July 30, stickleback eggs and snails were the main articles of diet, salmon eggs making up only 7.5 percent of their food. Of the trout taken between August 17 and September 9, salmon eggs made up 35 percent of the diet, with sticklebacks and snails next in importance.

Trout take a heavy toll in the early spring when the salmon fry are migrating down stream into the lake. However, stomach contents of trout taken during the summer months showed very few remains of salmon fingerlings, none being found in the July samples, and only 1.2 percent in August and September.

Data on the returns from known escapements were collected, escapement and catch records were compiled, and scale samples taken throughout the season for the purpose of age determination. Complete returns from the 1929 spawning are now at hand with the exception of the few 7-year fish which will return in 1936. The 1929 escapement was 900,519 and the return per fish from this escapement will be approximately 1.6 to 1.0, as compared with 2.2 to 1.0 for the 1928 escapement and 1.8 to 1.0 for the 1927 escapement. There is considerable evidence toward the belief that these returns are below normal and are, in the main, caused by unfavorable environmental conditions existing in Karluk Lake during the time these fish were residents there.

CHIGNIK RIVER RED SALMON

This investigation was continued in 1935 on a much reduced scale. As in 1934 a temporary assistant was stationed at Chignik from May until October for the purposes of collecting fish scale samples, and of observing the commercial catches for marked fish. The data collected have been filed for future use.

PINK SALMON

The activities of this investigation in 1935, as in past years, were confined mainly to the study of the pink-salmon populations of southeastern Alaska. Although the pink salmon are found in practically all of the waters of Alaska they are most abundant in this section. The salmon populations that support this fishery spawn in hundreds of streams, varying greatly both in size and character of habitat. Hence it is believed that the fundamental facts secured from the study of the fishery in this section may be applied generally to the pink-salmon fisheries of Alaska. Dr. Frederick A. Davidson is conducting this investigation, assisted by S. J. Hutchinson.

Studies were continued on the factors responsible for the fluctuations in the abundance of pink-salmon populations that spawn in the stream at Little Port Walter, Alaska. A counting weir has been maintained in this stream during the past two seasons. In the summer of 1935, 6,075 pink salmon were tallied through the weir on their migration upstream to the spawning grounds. Samples of this run of salmon were taken at the weir throughout the migratory period. These samples were studied for the purpose of determining the sex ratio, fecundity, and racial characters of the pink salmon composing the 1935 population. Observations on the spawning grounds in the stream indicated a successful spawning of this population. During the entire year records were kept of the prevailing meteorological and hydrographic conditions that tend to influence the development and mortality of the brood. Since the study of the pink-salmon populations at Little Port Walter has been carried on for two seasons only, no returns have yet been secured from known spawning populations.

The pink salmon migrating into the stream at Little Port Walter were studied also from the standpoint of the physical and chemical changes that take place within the body during their spawning migration from the sea. This is a continuation of the cooperative study of this phase of the life history of the pink salmon that the Bureau has been carrying on for the past few years with the National Canners Association of Seattle, Wash. The results of this study provide information relative to the seasonal change in the market quality of the pink-salmon pack each year that is of primary importance to the canning industry. A preliminary report of the progress of this study up to 1935 was completed during the past year and was published as Investigational Report No. 33 of the Bureau.

Owing to the need for further information concerning the migrations of pink salmon through Clarence Strait in southeastern Alaska, a pink-salmon-tagging experiment was conducted in this area during the summer of 1935. The runs of salmon that migrate into Clarence Strait from Dixon Entrance are composed of different races that are bound for the spawning areas adjacent to the strait through the entire course of 130 miles. McLean Arm, which is approximately 8 miles above the junction of Clarence Strait and Dixon Entrance, was selected as the point for tagging. Through the courtesy of the Alaska Pacific Salmon Co., 1,900 pink salmon were tagged from their McLean Arm trap in lots of 400 and 300 each, during the weekly closed periods beginning July 27 and ending August 17.

This is the first of the salmon-tagging experiments conducted in Alaska that includes a series of consecutive taggings at one point. It is hoped by this method to secure a more detailed analysis of the migratory routes and parent localities of the pink-salmon runs that pass through Clarence Strait during the entire fishing season. The returns from this experiment have thus far amounted to more than 33 percent of the total number of tags placed on the fish. Since the pink salmon have a complete 2-year life cycle, there are two distinct populations in each stream; viz, those spawning on the odd years and those spawning on the even years. In view of this fact, it is planned to conduct a similar tagging experiment in Clarence Strait in the summer of 1936 to determine any differences that might occur in the migrations of the pink salmon that comprise the even year runs.

Although the native distribution of the Pacific salmon has been discussed from time to time by various icthyologists, no one has made a study of the environmental conditions in the different habitats in which these salmon are found. Furthermore, no attempt has been made to compare the environmental conditions found in the foreign habitats whither they have been successfully or otherwise transplanted, with the conditions in their native habitats. Such a study was started during the past season for the pink salmon and then extended to embrace all species of the Pacific salmon. It is hoped that this study will indicate some of the limiting factors that are responsibile for the geographic distribution of the salmon.

ALASKA SALMON FISHERY STATISTICS

There has been an ever growing need for an investigation dealing with the collection, compilation, and biometrical analysis of the daily catch records of the various types of fishing gear employed in the Alaska salmon fisheries. These records form the basic data for studies concerned with changes in the abundance and character of the salmon runs, and the competition between the various types of fishing gear. It is through such studies that the conservation of the salmon runs is assured for they provide the factual basis for the proper regulation of the fisheries.

Through a cooperative arrangement between the Alaska Division and the Divisions of Scientific Inquiry and Fishery Industries, funds were made available for the establishment of this investigation during the past year. Leroy Christey, who has had experience in fishery studies of this type, was employed to take over the duties of the investigation under the direction of Dr. Davidson.

In 1927–28 the daily catch records of a large number of salmon traps in southeastern Alaska were collected and studied for the purpose of providing information concerning the delimitation of the fishing districts and closed seasons for fishing in each of the districts in this region. This study was resumed in 1930 as a part of the pink-salmon investigation, and since then effort has been made to continue the collection of such records which have provided information for the further delimitation of the fishing districts and closed seasons for fishing in this region.

Since this study was carried on as a part of the pink-salmon investigation, time and funds were not available to make a comprehensive collection and study of all the trap catch in southeastern Alaska.

Hence one of Mr. Christey's first accomplishments in this new investigation was to make a thorough and exhaustive search for all data previous to 1930. Effort was made to contact all packing companies operating at the present time or in the past. While the catch records of some liquidated companies have been detroyed, sufficient data have been obtained to insure an adequate sample from 1907 to the present date. In addition to securing old records, it has been possible to contact the trap operators and impress them with the value of this work. The daily catch record was secured for each trap fished in southeastern Alaska in 1935.

As time permits, this work will be expanded to include other Alaska fishing areas. Considerable trap catch data have already been acquired for Prince William Sound, including complete returns for 1935. Some trap catch records also have been secured for Cook Inlet, and areas on the Alaska Peninsula. It is hoped that this work may be expanded to include the study of other units of fishing gear, especially the gill-net fishery of Bristol Bay.

HERRING

The herring investigation, under the direction of Edwin H. Dahlgren, was continued during the past year. The efforts of the investigation were again concentrated in southeastern Alaska, where the most productive and intensive fishery is carried on. The principal aims of the investigation are to delineate the areas inhabited by each of the major stocks of herring which comprise the total population of the area, to evaluate the relative abundance of each of these stocks, and to seek causes for the fluctuations in abundance which are known to occur.

The tagging program, begun in 1932, was continued. This tagging has a two-fold purpose; first, to delineate the areas inhabited by each of the major populations of herring; and second, to obtain a measure of the intensity of the fishery by considering the percentage of tags recovered. During the spring spawning season, tagging was carried on at Craig, on the west coast of Prince of Wales Island, and in the vicinity of Sitka, on the west coast of Baranof Island. As in the 1934 experiment, a large number of individuals were tagged in order to obtain more reliable estimates of the mortality imposed by the fishery. During a 3-week period 13,008 individuals were tagged at Craig; 20,157 at Sitka; 5,141 at Kalinin Bay, 25 miles north of Sitka; and 2,613 at Redoubt Bay, 15 miles south of Sitka.

The recovery of the tags affixed at Kalinin Bay and at Redoubt Bay, along with those affixed at Sitka show that these populations intermingle on the Cape Ommaney feeding grounds, and comprise a single stock of herring. The recovery of 86 tags affixed at the Sitka area, as well as 74 tags affixed at Craig, from Warren Channel, confirmed the findings of the previous year that there is an intermingling of Craig and Sitka fish in this area. On the other hand, failure to recover Craig tags in the Cape Ommaney region, leads to the conclusion that there is no counter migration of Craig fish to Cape Ommaney.

A method for the detection of the tags to supplant the present magnetic recovery system was tried out during the season—a method whereby the individual bearing the tag may be selected from the large number of herring passing through the shore stations. The device is dependent on the bridge-circuit principle, in which the presence of the metal passing through the coils creates an unbalance which may be converted into a power impulse to eject the individual bearing the tag. The instrument proved feasible, and 66 tags were recovered during the season. The advantages of the device lie in the facts that it is possible to determine with greater accuracy the origin of the tags; to better evaluate the mortality imposed by the fishery; and by examination of the individuals bearing the tags, to determine the effect of the tags on the host.

There has always been a question as to how large a percentage of the population is taken by the fishery. The popular belief has been that only an immeasurable part is caught, and that the decline in abundance observed in certain intensively fished areas has been due entirely to the emigration of herring from that region.

Assuming that the tagged fish are distributed with the remainder of the population in a random manner, which appears to be the case from the fact that tags are returned from the various separate markings (throughout a greater part of the season), then the percentage recovery of tags gives a measure of the percentage of the total population taken. The figures herein given are admittedly in error, and represent the absolute minima of imposed mortality. There are three known sources of error which, at present, cannot be evaluated. First, there is probably a mortality caused by the tagging; second, there may be a loss of tags by their working out of the fish in life; third, there is a failure to obtain all the tags recovered by the fishermen due to inefficiency of the magnets, the loss of tags to souvenir hunters, etc.

Without considering these sources of error, however, it it evident that the fishery takes a considerable toll from the populations in the more intensively fished areas. That this is the case in the Cape Ommaney fishery is evidenced by the recovery of 101 or 4 percent of the Sitka tags in 1933; 482, or 4.4 percent in 1934; and 1,628 or 7.2 percent in 1935. The second main stock from which the fishery is drawing is that which spawns at Craig. For this fishery a 2.0 percent return (149 tags) in 1934, and a 2.3 percent return (233 tags) in 1935, indicates that this stock is not as intensively fished as is the Sitka population. These figures represent the recoveries of only one type of tag—others have been experimented with in an attempt to find the most suitable type possible.

For the past few years, 70 to 85 percent of the entire catch for southeastern Alaska has come from the Cape Ommaney region. There was a marked decline during 1935 in the catch per unit of effort in this area. This decline is accounted for by the failure of the normal increment of 4-year-olds to enter the catch. The catch for 1934 was dominated by the 4-year-olds from the brood year 1931; during that year they represented approximately 66 percent of the catch. The next year, however, owing to the failure of the new class of 4-year-olds to appear, this same 1931 brood furnished 89 percent of the catch; while the 1932 brood year, entering the catch for the first time, constituted only 3 percent of the catch. Thus the 5-year-olds, a class which had already been subjected to intensive fishing during one season, and suffered the inroads of natural mortality, was not sufficiently abundant to maintain the catch on a high level of abundance.

With the spawning areas contributing to each feeding area known, it will be possible to estimate the abundance, and the size composition of the catch to be expected during the following season, by sampling the age composition of the spawning population during the spring. Thus, for the Sitka population, unless the new recruits entering as 4-year-olds in 1936 are relatively very abundant, the present low level of abundance may be expected to continue. This information will prove invaluable in providing for a stabilized fishery by permitting the formulation of regulations to spread the fishing intensity over the populations best able to withstand the strain.

INVESTIGATION CONCERNING THE PROTECTION OF MIGRATORY FISH AT THE BONNEVILLE DAM

Satisfactory progress has been made in the problem of providing suitable fishways at the Bonneville Dam. The work has continued under the direction of Harlan B. Holmes, assisted by Henry F. Blood, both of whom have had the temporary assistance of other biologists and engineers. The work has been conducted in close cooperation with the staff of United States Engineers and the State fish and game departments. The program and results of the first year's activities are briefly related in Progress in Biological Inquiries, 1934.

Formal recommendations were submitted to the War Department by the Commissioner of Fisheries in August 1934. After prolonged consideration the War Department approved a plan of fishways that for the greater part followed the recommendations of the Commissioner of Fisheries. Some features that the Bureau's staff had not considered essential were added. The collecting systems for attracting and directing the fish to the fishways in the main channel were materially reduced.

The detailed designing of the fishway is being done by the staff of United States Engineers. The staff of the Bureau of Fisheries has remained in close contact with the Engineers, and has found occasion to offer suggestions.

The progress of construction of the dam has been carefully followed with the view of assuring the free passage of fish during the period of construction. Although the skeletal structure of the powerhouse, which obstructs one channel of the river, and the base of one-half of the spillway dam, which will obstruct the main channel, are nearing completion, as yet there has been no interference with the passage of fish. It was anticipated, however, that temporary fishways will be required during the latter stages of construction. A study of the anticipated condition has been made and temporary fishways have been designed.

An extensive study was made of the injury to fish in passing through water turbines. Preliminary results of the investigation indicate that there is a tremendous variation in the conditions presented by different plants, with the result that some certainly could not be passed by even the smallest fish, whereas others may cause little or no injury. The Bonneville turbines are judged to approach the latter. It therefore has not been considered necessary to install means of preventing the seaward migrating fingerlings from entering the turbines.

A study also was made of means of directing the route of travel of migrating fish in places such as the rapidly flowing water discharging from the spillway gates and power wheels. Particular attention has been given to the electric fish diverter. The nature of electric fields produced by various means of applying electricity to the water have been studied in the laboratory. The more favorable of these soon are to be applied in field tests.

SHELLFISH INVESTIGATIONS

PAUL S. GALTSOFF, *in charge*

The scope of the shellfish investigations was greatly enlarged by a special appropriation of $100,000 for the study of oyster pests, and the development of practical methods of their control in the Atlantic and Gulf States. The investigations on oyster and hard clam culture were continued in the waters of New England, South Atlantic States, and Puget Sound. A special allotment of $20,000, to be spent over a period of 18 months, was provided by the P. W. A. for a study of the failure of oyster culture in York River, Va., allegedly caused by pulp mill wastes. All the work has been carried out by the regular staff of the Bureau of Fisheries augmented by 20 temporary investigators, and 50 assistants whose period of employment varied from 3 to 9 months. Splendid cooperation was received from the various States, the P. W. A., and transient rehabilitation camps which supplied about 110 relief laborers for the field investigations.

OYSTER-PEST CONTROL PROJECT

The oyster-pest investigations comprised three major problems: (1) the starfish infesting the waters of New England and the North Atlantic States; (2) the drill, in the Delaware and lower Chesapeake Bays and occurring as far south as the Gulf of Mexico; and (3) the so-called leech, the recent outbreak of which has wiped out extensive areas of oyster producing bottoms in Florida. The problems of the destruction caused by the boring sponge and the borer, although of lesser importance, were also included in the program.

Practical methods that can be used by the oyster industry for the control of these pests must be based on a thorough knowledge of their life histories, and an understanding of their habits and activities. The applicability of control methods must be determined by large-scale experimentation.

In order to provide for efficient management of these investigations the entire Atlantic and Gulf area has been divided into sections with centers at Woods Hole, Mass.; Wickford, R. I.; Milford, Conn.; Bivalve, N. J.; Solomons, Md.; Beaufort, N. C.; and Apalachicola, Fla.

New England section.—Under the direct supervision of Dr. Galtsoff, studies of the starfish and drill along the Massachusetts coast were begun in June. Surveys were made to determine whether the sudden appearance of large numbers of starfish is due to invasion from other territories or to the increased propagation of the local stock. Both field and laboratory work were carried out by Dr. K. S. Rice, Charles F. Reppun, and George Mishtowt.

There is no indication that starfish migrate during cold weather, their distribution over the bottom of Buzzards Bay being more or less constant with only small changes during the various seasons. The greater concentrations were found on the New Bedford side near the head of Buzzards Bay. The comparatively small number of starfish now found in the bay is perhaps due to the combined efforts of various town and State authorities who, with the help of Federal relief grants, succeeded during the past 2-year period in removing 173,300 bushels of starfish, or about 52 million adult organisms.

From laboratory experiments on the chemical control of this pest, in which 22 various inorganic substances were used, it seems evident that from every point of view, copper sulphate is the most satisfactory poison for killing starfish. In comparative ease of application, low cost, small effective concentration, rapid diffusion, and quick action, it is superior to other toxic substances that can be used in the sea. Under laboratory conditions it was found to be effective in great dilutions in killing starfish. Experiments were made to develop a copper-glue compound jelly which, placed on an oyster bed, would slowly diffuse, creating for a short time a concentration of copper sulphate sufficient to kill starfish, finally clearing itself completely, leaving none to injure the oysters. Earlier work with copper showed that its combination with a protein in order to produce a slow diffusion in water is lethal to starfish, but harmless to oysters within the time limits chosen. However, further experiments will be required in order to ascertain the most favorable concentration for practical purposes.

During the summer laboratory studies were conducted on the feeding habits and oviposition of the oyster drill, *Urosalpinx*. It was found that oysters, both young and adult, mussels, scallops, clams, barnacles, and some other mollusks are all used by the drill as food. *Anomia*, however, is never attacked. It appeared that barnacles are the favorite food.

Experiments in trapping drills on the rocky bottoms in the Woods Hole section proved unsatisfactory because the barnacle-covered rocks seemed to provide such an abundance of food that the drills could not be attracted by bait.

Laboratory observations indicate that there may be some correlation between the number of egg cases laid, and the amount of food available.

Attempts to poison drills with copper sulphate were entirely unsuccessful until dilute solutions were used that permitted the drills to remain open and active. This was found effective as a lethal agent when employed for a protracted time. Dilutions of copper sulphate of 0.3 parts per mille were effective in 18 days.

A survey of the Narragansett Bay, R. I., region was carried out by J. J. Hellewell with the cooperation of the Rhode Island State College which offered its laboratory facilities at Wickford, R. I., Dr. Charles J. Fish, who assisted in inaugurating the project, and the State Commission of Fish and Game which provided a laboratory space at the State lobster hatchery at Wickford, R. I.

From the beginning of the work in July until its close in February, two extensive cruises were completed and many trips made, covering 150 stations, which, within the limits of the bay were established 1 mile apart, and at a distance of 4 miles apart in the sound. Observations consisted of dredging for starfish, recording data on temperature, salinity, depth, and the character of the bottom.

The October survey of these waters showed the starfish population to be concentrated in comparatively large numbers in two rather restricted localities near the headwaters of the middle passage. Weekly observations to detect the possible movements of starfish failed to show changes in their distribution and at the end of January the ranges of the two concentrations were much the same as in October. There was no indication of invasion of starfish from outside waters. Measurements of the starfish obtained from the two localities showed that those found nearest the headwaters of the bay (possibly an earlier seasonal production) averaged significantly larger, although the two localities were separated by a distance of only a few miles.

Winter studies show that as the temperature approached the winter minimum there was a cessation of growth, and a reduction in the rate of feeding of specimens kept in a live car. The size of these experimental animals in December coincided exactly with the mean of the stock from which they were obtained in October, indicating that the live-car records probably approximate normal conditions. As the difference in the mean size of the two groups has remained the same it is thought that the smaller group represents later production in the lower bay where seasonal warming is slower than in the headwaters, and that this group will mature and spawn at a smaller size.

The Oyster Laboratory at Milford, Conn., was the center of the investigation on the life history, biology, spawning, setting, and the migrations of starfish. The work was carried out by Dr. V. L. Loosanoff with the assistance of J. C. Lipsett, E. J. Larson, R. Nauman, A. Kammeraad, J. Piaat, R. B. Burrows, and H. Beard, and in cooperation with the Connecticut Shellfisheries Commission, which generously supplied the State boat *Shellfish* for the work in Long Island Sound.

The first survey covering 141 stations in the Sound was made in May, and was repeated during September and December. Results of field observations made during the spring, fall, and winter, show that starfish are practically limited to the shore regions of the Sound, although opposite New Haven and Bridgeport they extend some distance out into deeper waters. On the Long Island shore there are gaps at each end of Smithtown Bay and at two other eastern points where starfish appear to be absent. The longest shore gap however, is on the Connecticut shore from the Connecticut River to Guilford. Considering only the 43 stations where starfish were found, 93.4 percent in the first survey, 85.8 percent in the second, and 79.0 percent in the third, occurred in less than 40 feet of water, the greatest number being found at depths between 20 and 39 feet.

No correlation has been noticed between either the temperature or salinity of the water and starfish distribution, but the distribution is practically limited to those areas where shells are present on the bottom. Shells were found at 110 of the 141 stations, 89.9 percent of the starfish population being confined to these shell-covered areas. The greatest concentration of starfish was found in the extreme western part of the sound on the Long Island side on abandoned oyster beds, and bottoms covered with dead shells. Results of the surveys are of considerable practical importance for they disclosed the presence of great numbers of starfish on bottoms which are neglected by the oystermen.

Although a few specimens of *Asterias vulgaris* and *Henricia sanguinolenta* were found, *Asterias forbesi* is by far the predominating species of starfish found in this region.

Throughout the year the majority of starfish taken were of medium size, 2 to 5 inches in diameter, the size distribution being markedly similar for all surveys. The slight increase in the proportion of small starfish found in the winter survey is due to appearance of the 1935 crop.

Although field surveys have demonstrated a certain stability in the starfish population of this area, a direct attempt to study the movements of starfish seemed to be desirable. After experiments had shown all forms of tagging to be unsuccessful, a method of vital staining was developed and successfully employed. On November 19, approximately 15,000 starfish stained with nile blue sulphate were released at a known point in the sound. Since then extensive mappings have shown that migration is evidently slow, as in 2 months the most distant blue starfish were found only about one half a nautical mile south and west from the point of release. Five months later the starfish were still holding the blue color although a few were somewhat faded.

Laboratory studies on the condition of starfish gonads showed that in November there is an increase in gonad size, apparently in preparation for next year's spawning. In Long Island Sound the gonads appear to be mature before January, while near Woods Hole, Mass., maturity is not reached until late February or early March. It has been found that *A. forbesi* spawns when the temperature of the water reaches 20° C, provided the gonads are mature. Spawning in Long Island Sound first occurs about June 26–28, and continues until August 20.

Studies of the development of the larvae under laboratory conditions showed the larval period lasts 21 days at an average temperature of 20–21° C. Setting continued from July 15 until September 9, taking place at depths from mean low water to 70 feet.

A protozoan parasite, *Orchitophyra stellarum* Cepede, has been found in the gonads of the male *Asterias forbesi*, occurring in about 1 of every 15. It causes a great reduction in the number of spermatozoa in the follicles of the testis, often inducing total sterility. Work is now in progress to study the life history of this organism and its mode of infecting starfish.

New Jersey and Delaware Bay section.—The principal aim of the Bureau's work in New Jersey is the control of the oyster drills, *Urosalpinx* and *Eupleura*, which constitute a serious menace to oyster production, causing a loss to the Delaware Bay oyster industry of approximately $1,000,000 a year.

Headquarters were established at Bivalve, N. J., with a field station at Cape May, N. J., where the State of New Jersey maintains an oyster experiment laboratory. Still another station was in operation during June, July, and August at Barnegat Bay, N. J., where studies were made on the activities of the drills with relation to changes in environmental conditions. The cooperation of the State of New Jersey, both by a generous offer of laboratory and office facilities, and by the use of its personnel and equipment, made possible a much broader and a more thorough study on the biology of the drill and the methods of its capture than would have otherwise been possible.

The work was carried out in cooperation with Dr. Thurlow C. Nelson, by Dr. Sizer, J. B. Engle, and H. H. Haskin. The State W. P. A. branch generously cooperated with the Bureau of Fisheries project by assigning 10 relief laborers for the construction and handling of drill traps, and by providing the boat for trapping experiments. Because of the seriousness of the drill problem in Delaware Bay, the work was carried out throughout the year and valuable information was recorded on the behavior of the drills during the winter months.

Two methods of controlling drills were attempted in Delaware Bay. One was the use of a chicken-wire bag trap that could be hauled to the surface at regular intervals, making use of the habit of the drill to climb upon any elevated portion of the bottom to feed and lay eggs. By using 3,500 traps for a period of 6 months, a total of approximately 1,300,000 drills were caught. To attempt control on a commercial scale, traps were concentrated in areas where tests showed the densest population. The traps were baited with young oysters and rebaited as often as needed, about once a month, and attached by snoods to a line of copper oleated rope, about 50 traps to a line. Four to six of these lines were placed at a station and tended weekly.

The other method of control developed during the course of the investigation consisted in dredging the bottoms with a drill dredge, especially designed to make it economical and available to the commercial oysterman. It is operated practically the same as an oyster dredge.

The combination of trapping with wire bag traps and the use of the drill dredge is considered a practical and efficient means of oyster drill control for Delaware Bay.

Since the knowledge of the life history and behavior of any destructive animal is essential for the operation of control measures, a comprehensive study was made of the habits, migration, and propagation of the drill.

A series of experiments was conducted on the migration of drills under varying conditions of temperature, salinity, and bottom. Results showed that drills are influenced in the direction of their migration by the position of food, that they move at a rate of at least 150 feet in 48 hours in the direction of food, and against prevailing currents. These migrations were performed over a bottom of loose sand and mud devoid of oysters or shells. The drill proved to be active over the wide pH range of 6.5 to 9.1. At the acid and alkaline extremes a slowing up of activity was apparent.

Observations made in the laboratory during the winter months on the effects of temperature on drill movement showed some locomotion even at the low temperature of 2.2° C. The rate of feeding and consequently the destruction of oysters by the drills increases with temperature. The interval between feeding periods varies from 5 to 12 days. One drill will destroy, on the average, 0.34 oyster per week during the summer months, this estimate being lower than that reported at Beaufort, N. C. The salinities and temperature in New Jersey waters are somewhat lower than those at Beaufort, but this would probably not entirely account for the appreciable difference in rate of destruction at the two places.

Below a salinity of 10 to 12 parts per mille, the drills are inactive in boring the shells of oysters. Above this critical point there is no appreciable change in activity with the increase in salinity. Salinities between 10 and 15 and 30 and 35 reduce vitality of drills, while life cannot continue in salinities below 10 and above 35.

As a result of winter observations the following conclusions can tentatively be drawn: (1) Drills do not burrow in the mud during the cold period; (2) they do not seek cavities or empty shells as a place to hibernate; (3) they become dormant during extreme low temperatures (2.2° C or lower) and remain on the surface of the bottom.

Experiments using bivalves of equal ages as bait failed to show that the drills select those having the thinnest shells. If mussels (*Mytilus edulis*) whose shells are thinner than those of oysters are placed in a trap along with oysters as bait, the drills will attack the mussels first. It has been shown, however, that this preference is not owing to the thinness of their shell but to the fact that the meat of the mussel is preferred to that of the oyster. Consequently, mussel bait is twice as efficient for catching drills as oyster bait. Drills prefer the young spat to 1-year-old oysters, a reaction due not to the thinness of the shell, but probably to a difference in the chemical nature of the exudations of oysters of different ages.

Urosalpinx and *Eupleura* have been found to be equally destructive, although the latter is much more active in oviposition. This fact is especially important in view of the rapidly increasing ratio of numbers of *Eupleura* to *Urosalpinx* on the New Jersey oyster beds.

Urosalpinx cinerea deposits an average of 8 eggs per case and *Eupleura* sp. lays an average of 22 eggs per case. The bimodal frequency curve obtained for the number of *Eupleura* eggs per case indicated the possibility that two distinct varieties of snails of this genus were encountered. Further work will have to be done before this problem is solved. No significant variations in the number of eggs per case as related to salinity are apparent.

It has been found that adult drills can survive under environmental conditions in which they cannot reproduce. Drills placed in a trap and kept for a month in water where at low and high water the salinity varied from fresh water to 7 or 8 parts per thousand but frequently remained at or near the zero point throughout the entire tidal cycle survived, although no oviposition took place after the first week.

As noted previously by other investigators, not all of the eggs deposited develop into young drills. Study shows that approximately one-half of the eggs laid in the capsules fail to mature. Some develop into abnormal embryos and are eaten by the normal ones.

Direct evidence of cannibalism has been observed among adults, the animals having been drilled amid an abundance of oysters so that starvation conditions could not have been responsible for the attacks.

Urosalpinx may undergo its embryonic development in as short a time as 21 days. The fact that the egg cases under consideration were allowed to develop in their natural environment where the bottom temperature varied between 23.3 and 29.1° C. is stressed emphatically for it probably affords the explanation of the much shorter time than the 40 days in laboratory tanks at comparable temperatures, reported by another investigator as the time required for hatching. It has also been found that as many as 53 days may be required to complete development.

Middle and South Atlantic section.—Due to reports that the boring sponge, presumably *Cliona celata*, was a definite menace to oyster culture in Maryland waters, the Bureau undertook an investigation, assigning Dr. N. A. Wells and Dr. M. Old to study this problem. Through the cooperation of the University of Maryland, laboratory facilities were made available at the Chesapeake Biological Laboratory at Solomons, Md.; and a boat and captain were provided by the Maryland Conservation Department.

During the summer representative oyster beds in the Maryland waters of the Bay and all the major beds in the Potomac and Patuxent Rivers were surveyed. As the investigation progressed it became evident that practically all of the Maryland oyster-producing beds were free of *Cliona celata*, but many of them were infested to a greater or lesser extent with *C. vastifica*, another species of the same genus which had never been considered of importance as an oyster enemy. At only 2 of the 63 stations was *C. celata* found on living oysters. At one other station both *C. celata* and *C. vastifica* were found on shells, while the sponge at other stations was found to be *C. vastifica*.

Since there were no traces of *Cliona celata* at any salinity below 15.75, it is thought that this species will not live in a salinity below 15 parts per mille, but in order to substantiate this observation, further investigation is necessary.

The study of the distribution of *Cliona vastifica* shows that the highest percentage of infestation occurs between the salinities 11 and 13 parts per mille, although *C. vastifica* infestation is not necessarily at its highest peak wherever this salinity range is found. The lowest salinity in which this species is found appears to be 10 parts per mille while the upper limit has not yet been determined.

Heavy set and consequent overcrowding produces perfect conditions for spread of infestation. Because it is not unusual to find a large clump of oysters in a heavily infested area, entirely free of sponge, it is thought that the principal method of transmission is vegetative. In the laboratory gemmules of *Cliona vastifica* were demonstrated, occurring in every case in the marginal perforations and not in the older excavations. Among oysters taken from the anchor chains of ships in the Patuxent River and undisturbed for many years, only 3 percent were infested, pointing to the insignificance of larval attachment.

Although heavy infestation weakens the shell, in some cases rendering the oysters unfit for market, in the opinion of some of the oyster packers and planters the sponge does not adversely affect the oyster in these waters. This does not prove, however, that the boring sponge is not a menace in other localities, particularly in the South Atlantic States where its destructive power may increase with the increase in mean annual temperature.

The work in the Middle and South Atlantic States carried out under the direction of Dr. H. F. Prytherch by William Hagen, Lloyd Garris, K. E. Johnson, G. R. Lunz, Jr., and assistants, consisted in large scale drill trapping experiments in the region from Chincoteague, Va., to Cape Charles, Va., where estimated damages caused by the drills amounted to over $150,000 annually. Also, comprehensive surveys of the distribution of oyster pests were made in the lower Chesapeake Bay and in the waters of North Carolina, South Carolina, and Georgia.

Through Paul B. Murphy, director of the Fort Eustis Camp for Transients, the services of approximately 100 transient laborers were made available for routine operations. A temporary field camp was established at Chincoteague and the U. S. S. *Kittery*, a 10,000 ton steamer, was anchored in the Onancock Harbor for use as a station ship. Six power boats were used to transport the crews from these locations to the oyster beds, where collections of drills were made by the use of traps in the case of deep-water beds or by handpicking on exposed tidal flats.

Small wire bags baited with seed oysters, similar to those employed in New Jersey, were used. Traps attached in groups of 25 to a heavy rope line at intervals of 10 feet were fished once a week and the drills which had entered to search for food or to deposit their egg cases on the shells of the seed oysters were removed by vigorous shaking into containers aboard the boats. Experiments were carried out to determine the most effective arrangement of trap lines for removing drills from a given area, and to protect planted beds against invasion of these pests from surrounding bottoms. Over an average period of 12 weeks, 3,744 traps of various designs were used.

Trial of various methods of trap arrangement showed that the most successful and least expensive procedure for removal of drills from a given area is to anchor one end of a 250-foot trap line in approximately the center of a 4-acre unit and shift the position of the line about 45° each week. The second time that this area was trapped by the same method, the collection of drills decreased over 60 percent, indicating that the previous circuit had caused a significant reduction in the number of these pests.

Drills may likewise be collected by using parallel lines of traps which may be left stationary or moved a few feet after each weekly fishing, but this procedure involves a greater amount of labor, material, and time than the circular method. The results indicate that the use of 25 traps per acre on cleaned bottoms in Chincoteague Bay will remove virtually all of the drills in approximately 18 weeks.

Comparison of results with traps containing seed oysters and those containing clam and oyster shells showed that the former are seven times more efficient for catching these pests. A total of 80,838 drills of both species were removed from 60 acres of oyster beds, by hand picking, on the tidal flats at Wachapreague and vicinity.

Beds that have been cleaned and replanted with seed oysters can be protected against invasion of drills from surrounding bottoms by leaving an unplanted zone, approximately 20 feet wide, around the replanted area and surrounding the outer edge of this zone with a continuous line of traps set at 5- to 8-foot intervals. This method when tested on a commercial scale, showed an average collection of 5,760 drills per 25 traps over a period of 8 weeks. Subsequent examination of the seeded area showed an almost complete absence of drills, thus indicating that trapping operations of this type are of practical value for the protection of oyster beds.

It is clearly evident that the drill is a serious oyster pest, of such economic importance as to justify the immediate adoption and extensive application of control measures of the type outlined by the present investigation.

Two species of oyster drills occur in this region, namely *Urosalpinx cinerea* and *Eupleura caudata*, the former being considerably more numerous and destructive to oysters, comprising over 78 percent of the number collected. Prolific reproduction of *Urosalpinx* was observed in the heavy deposition of egg cases during June and July and the more or less continuous spawning of this species over a period of 7½ months. Egg cases of *Eupleura* were found in only three instances in numerous examinations of natural and planted beds.

Studies of the distribution, abundance, and possible control of oyster pests in the principal beds in Pamlico, Core, and Bogue Sounds and their tributaries in North Carolina were conducted in cooperation with the North Carolina Department of Conservation. In Core and Bogue Sounds where the salinity is high, ranging from 27.16 to 35.61 parts per mille, the destruction of 14 to 68 percent of spat and seed oysters by drills and 60 to 90 percent of adult oysters by boring sponge, was observed on beds located below low water mark. Drills were found to be most abundant on public beds in the vicinity of Harbor Island and Atlantic where 13 to 22 specimens were collected per bushel sample. By means of trapping operations a total of 10,755 drills were removed from these areas over an average fishing period of 4 weeks. In one locality an unusual catch of 3,238 drills was made with 100 traps in 1 week, of which approximately 94 percent were young specimens measuring from 3 to 14 millimeters in length. This particular area had been restocked the previous year with culled seed oysters from drill infested beds near Portsmouth, thus demonstrating how transportation of egg cases of this pest may cause its spread to other beds.

Field investigations were conducted from June 15 to October 15 along the western shore of the Chesapeake Bay in cooperation with the Virginia Commission of Fisheries. Observations at 245 stations showed the drill to be abundant throughout this region. An average of 9 drills and 35 egg capsules were found per bushel of oysters. Drills were most numerous in lower portions of the bay and rivers where the salinity ranged from 19.05 to 24.25 and were absent in salinities lower than 15 parts per mille. A total of 1,527 drills were collected, 70 percent of which were alive, the others having been killed by the freshets of the previous winter. Eighty-three percent of the total were *Urosalpinx cinerea;* and 17 percent, *Eupleura caudata.*

In South Carolina, in cooperation with the State Board of Fisheries, a general survey of oyster pests in the coastal region from the Santee River to the Savannah River was conducted for the Bureau by G. Robert Lunz, Jr., of the Charleston, S. C., Museum. Samples of oysters collected at 132 representative stations show that the boring sponge and drill are the principal enemies of economic importance in this section. Over 41 percent of all oysters collected were infested with the boring sponge, particularly the more common species, *Cliona celata*, which at many stations showed prolific growth and honeycombed the shell of from 80 to 100 percent of the oysters. Serious shell injury by this pest is limited almost entirely to beds lying below low tide level in the more saline areas near the inlets, where oysters on both natural and planted beds rarely survive for more than 2 years because of sponge attack.

Damage by drills is limited for the most part to spat and small seed oysters occurring chiefly in a zone extending from 1 foot above low water mark to the bottom of the bed. Other pests found occasionally are the starfish, conch, and borer, none of which were found to be causing serious damage during the present survey, In several localities a heavy growth of common anthozoan coral, *Gorgonia*, was found on beds below low tide level where it apparently causes indirect injury and smothering of oysters by reducing the circulation of water and increasing the deposition of mud and sand.

During the period from September 15 to November 15 a general survey of the oyster pests on the Georgia coast was conducted in cooperation with the State department of game and fish. Observations made at 141 stations extending from the Savannah River to the St. Mary's River, show an abundance of drills on the natural beds, and an extensive and severe infestation of oysters by the boring sponge. Studies of drill distribution in relation to salinity show their presence at salinities from 10.4 to 30.6, the maximum abundance occurring in salinities from 24.3 to 27.7, or an average of 18 drills per sample. The boring clam, *Martesia*, was found to be a pest in this region, infesting the shells of 24 percent of the specimens examined, but in no case was it so abundant as to cause serious weakening or injury to the shell. Specimens of the borer, *Purpura*, and the conch, *Busycon*, were collected at 27 stations in salinities ranging from 17.6 to 30.4, but were not sufficiently numerous or destructive to oysters as greatly to reduce their production in this region.

Studies of the parasitic microorganism found in oysters in Louisiana, Virginia, and North Carolina were continued at the Beaufort laboratory by Dr. H. F. Prytherch. An improved technique was developed whereby rapid examination of the fresh tissues of spat and adult oysters could be made to determine the degree of infection by this protozoan, and the various stages in its life history. Examinations of over 750 spat collected during the period from March to December, show that the heaviest infection of the oyster tissues occurs during the summer and fall months, and is followed by rapid reproduction and spore formation in the body of the host. Although the parasite has not yet been identified, its position as a member of the class Sporozoa has been confirmed by Dr. R. R. Kudo of the University of Illinois.

South Atlantic and Gulf section.—Oyster-pest investigations were undertaken on the Gulf coast, covering the inshore waters of Florida, Alabama, and Texas. Previous surveys and reports from members of the fishing industry showed that the most destructive pests in this section are the borer, *Thais*, and the leech, or wafer, *Stylochus*. Other pests associated with these, but whose relationships as commensals or enemies are undetermined, are the boring sponge, *Cliona;* boring clam, *Martesia*, and barnacles and mussels. The most serious damage was reported from Apalachicola Bay, Fla., and it was therefore decided to make this area the headquarters for the Gulf investigations. Separate surveys were made in Texas and Alabama.

Owing to the unavailability of sea water in Apalachicola, it was finally decided to establish the laboratory at Indian Pass about 20 miles away, where electric power could be obtained and communication with Apalachicola was possible by road. The construction of the laboratory was begun on May 20. The site was furnished gratis by its owners, the Lagoon Co., and the materials were supplied by the State department of conservation through the cooperation of Commissioner G. W. Davis. By July the building was ready for occupancy. It is of frame construction, consisting of a main laboratory and six smaller rooms, and a basement for pumps, storage, garage, etc. In August the salt water pump was installed and by September the laboratory was supplied with running sea water. The floating equipment of the laboratory comprises a large and a small skiff, and a cabin cruiser with accommodations for four persons.

Before the completion of the laboratory, field work was undertaken by R. O. Smith and G. Gunter on the study of the borer problem. Traps of aluminum insect screen, baited with large and small oysters and mussels, were set on oyster bars. This type of trap caught *Thais* on barren bottoms where no other food was available, but was inefficient where oysters were plentiful. Traps made of copper wire proved toxic to both oysters and mussels used for bait.

Chicken-wire cages were made to carry out field experiments on the rate of feeding of *Thais* and destructiveness of this gastropod in various salinities. The cages were placed on 6 different bars with normal salinities ranging from less than 10 to over 30. Unfortunately freshets brought all salinities down to less than 10 for a long enough period to kill all *Thais*, the experiment resulting, therefore, only in the proof that oysters can withstand a lower salinity over a longer period than can the borer.

Laboratory experiments have shown that *Thais* suddenly subjected to a drop in salinity of from 25 or above to below 10, survive about 2 weeks. However, if the change is gradual the borer will live several weeks without food even though the salinity be reduced to below 5. In any case, both field and laboratory observations show that *Thais* can live very well in salinities between 15 and 25 parts per mille.

In contrast to such borers as *Urosalpinx* and *Eupleura*, *Thais* rarely bores a hole, and has never been found to do so in the thick part of a shell. Its mode of gaining entrance to an oyster is to cover the bill with its foot and under cover of this, rasp away the thin edge of the upper valve until a very narrow aperture is made. At present it is thought that a narcotic secretion is poured into the shell resulting in the narcosis and relaxation of the adductor muscle of the oyster. The presence of a large amount of purplish colored mucus found in attacked oysters along the frontal edge of the gills and the lack of mechanical means of holding the shell open during feeding seem to substantiate the observations, although further study of the problem is necessary. A *Thais* can kill and eat an oyster within 12 hours. In view of the relative ease and rapidity with which large oysters may be opened it is evident that the thickness of the shell is not a factor in the selection of food. Therefore, as shown by experiments in the field, trapping cannot be carried out successfully with baited traps.

Studies along this northwest coast of Florida show that, if 1935 was a normal year, spawning of *Thais* extends from late May to the early part of August, during which time temperatures are above 20° C. and salinities are over 20. There is a definite spawning migration, and egg laying is usually done by groups of individuals assembled in one place. Whenever possible capsules are deposited in masses on objects well elevated above the bottom. Each of these masses has been found to contain from 3,600 to 6,000 eggs. Development proceeds in the capsules for at least 7 to possibly 14 days.

The average size of the adults, both male and female, is 8 cm. Attempts to follow the rate of growth have so far been unsuccessful. Every area, from fresh water flats at the head of the bay to 5 fathoms out in the Gulf, was searched for young forms a number of times but out of several thousand specimens collected, less than half a dozen were under 5 cm in total length. It has been thought that last season was for some reason unfavorable for the survival of young *Thais*.

Beside the study of the distribution and habits of the borer, the field work in this section also included cruises for collecting hydrographic data for the practical purpose of obtaining a better understanding of the relationship existing between oysters, their enemies, and the various environmental factors involved. Hydrographic observations were confined to the oyster-producing areas of Apalachicola Bay, totaling about 130 square miles.

Although the laboratory is located in the pass between the Gulf and St. Vincent Sound there is a large difference between the maximum and minimum salinities even during the dry summer months. This wide range in salinities has a practical bearing on the oyster industry, for extreme changes from salt to fresh, or vice versa, render oysters unsuitable for the market. Oystermen frequently find it necessary to transfer operations from one locality to another in an attempt to locate oysters of marketable quality. It is believed that this situation might be greatly improved by setting aside suitable bottoms for the production of market oysters, while other beds would be used chiefly for seed production.

Examination of the oyster bars in this region has shown that the destruction of the large productive beds in St. George Sound has thrown an added strain on bars in other localities. The majority of the bars supplying the market are badly overfished, the supply of cultch is inadequate, and unless additional bars can be brought into production, the present rate of fishing on producing bars will result in a steady decline in the size and quality of the shell stock.

Life history of the leech.—A study of the two species of polyclad worms or so-called leeches, *Stylochus inimicus* and *Eustylochus*, associated with the oysters of this region, and at times so abundant as to do damage, was carried out by Dr. A. S. Pearse and G. Wharton. *Stylochus* has been found at Bull's Bay in Charlotte County, Tampa, Crystal River, Port Inglis, Cedar Key, Apalachicola Bay, Port St. Joe, and Crooked Island Sound. It is more common in summer than in winter. *Eustylochus* is being described as a new species, having a wide range along the Atlantic and Gulf coasts, and found in all of the localities just mentioned in Florida. This species is apparently more common in winter than in summer along the Florida coast.

The anatomy of both species of oyster "leeches" has been studied in some detail. The largest specimens of *Stylochus* collected measused 48 by 28 mm, while those of *Eustylochus* measured 22 by 9 mm.

Stylochus is remarkably fecund. A single individual kept in sea water in a finger bowl in the laboratory laid 22,370 eggs. The leeches found in oyster shells in Apalachicola Bay were found to be brooding clutches of eggs numbering as many as 18,028. For development, a *Stylochus* egg requires from 9 to 15 days at summer temperatures, and hatches into a ciliated larva similar to those characteristic of leptoplanid polyclads. After a time it tends to creep about on solid objects, and when adult entirely ceases to swim. Eggs of this form were still being found on oyster bars as late as January 11.

Neither *Stylochus* nor *Eustylochus* have been observed to eat any food other than the bodies of oysters, though the latter is believed also to eat barnacles. Observations show that they bite holes in the oyster's body, usually attacking the gills first. An oyster invaded by a leech usually secretes a partition along its edge to shut out the intruder and sometimes succeeds in covering it over so as to incorpporate it in the shell. An oyster occupied by a worm opens and closes its shell more often than under normal conditions.

Studies of the distribution of polyclads on the oyster beds in Apalachicola Bay at times showed more than 200 polyclads in a bushel of oysters. In general, *Stylochus* was most abundant where oyster bars were nearest the open sea; while *Eustylochus* was most abundant where mussels and barnacles are found; viz, close to shore or in inclosed lagoons. Polyclads such as these show considerable toleration to variations in environment, perhaps owing in part to mucus secreted abundantly when unfavorably stimulated. Low salinities undoubtedly cause their death. Eggs will not develop, and adults commonly do not lay eggs in salinities below 15 parts per mille and larvae have been killed in salinities as low as 13.9. When subjected gradually to progressively lower dilutions, the adults will live in a salinity as low as 6 parts per mille, *Eustylochus* enduring lower salinities than *Stylochus*. *Stylochus* endures considerable desiccation, reviving when immersed in sea water after a loss of 54 percent of its body weight.

Stylochus can survive in water which contains little oxygen. The effects of 23 chemicals on *Stylochus* in sea water were studied in an attempt to discover some substance which might kill the polyclads on oyster beds, but none of these has given promise of success. The larvae were less resistant than adults, but such high concentrations of poison were required to kill either that there seems little hope of controlling these pests by chemical means.

Texas.—During the summer of 1935 the oyster bottoms of the Texas coast were surveyed to discover the kinds and numbers of oyster pests present, and wherever possible to devise methods and make recommendations for their control. This investigation was carried out by Dr. Henry Federighi and A. Collier, with the cooperation of the Texas Game, Fish and Oyster Commission, who supplied the boat *Vivian*, which was converted into a laboratory and houseboat, and also the patrol boat *Eugene* and other floating equipment stationed along the Texas coast.

The survey, begun at Corpus Christi Bay and completed at Galveston Bay, followed very closely the Bureau's previous surveys in 1926 and 1931. Approximately 800 miles were covered during July and August, examinations being made of commercial reefs to determine the condition of the oysters, the salinity, temperature, character of the bottom, and the kinds and numbers of oyster pests present.

The most common oyster enemy in Texas, distributed from the Corpus Christi to Galveston Bays, is the common boring clam, *Martesia caribaca*, whose habit is to get a hold in an oyster shell and use it as a protective covering. In many cases it was found that a single oyster may harbor several hundred boring clams within its shell. Although it is probable this infestation has some effect on the growth and fattening of the oyster, it is impossible at present to state exactly what the effect is. Little is known concerning the life history of this pest.

Other pests found during the survey were the borer, *Thais haemastoma*, which does considerable damage in Louisiana and Florida; the common conch, *Fulgur perversa*, whose method of attack on oysters is still incompletely known; the boring sponge, *Cliona* sp., found only infrequently on the Texas coast, and probably of little significance; and the mussel, *Mytilus* sp., scattered here and there along the coast, and varying greatly not only from year to year but from season to season.

It was found that the tremendous destruction of the oyster beds in this section was due to the extraordinary increase in fresh water flowing from the flooded rivers of the Coastal Plain during May and June. In some areas there was a lack of live oysters due to the influx of the fresh water and its persistence over a period of time. In the northeastern part of Matagorda Bay, in past years the best source of oysters on the Texas coast, oysters have either been killed by the fresh water or covered with mud from the Colorado River, carried down into the bay since the removal of the dam.

INVESTIGATIONS ON OYSTER CULTURE

Long Island Sound.—Because of increased activities in connection with the oyster pest control investigations, the regular studies on oyster culture were greatly curtailed. A study of seasonal variations in the metal content of the oyster meats and its relation to environmental changes was carried out in Long Island Sound by Dr. P. A. Galtsoff and Charles Weber. Over 100 composite samples of oyster meats collected in previous years at the experimental oyster farm at Milford, Conn., were analyzed for copper, iron, zinc, and manganese. The results of the chemical analysis reveal interesting facts regarding the fluctuations of these metals in oysters taken from one locality. It has been found that copper is subject to wide and irregular fluctuations while the iron content remains almost constant. The manganese shows steady increase during the period of gonad development, and an immediate drop after spawning. More detailed studies showed that manganese is accumulated by the ovaries but not by the testes or other tissues. All the oysters were very rich in zinc, the content of which fluctuated between 5,500 and 13,700 milligrams of metal per kilo of dry meat.

Alabama.—At the invitation of Commissioner I. T. Quinn, chairman of the Alabama Oyster Commission, Dr. Galtsoff made a preliminary survey in November of the oyster beds in Mobile and Perdido Bays to determine the best areas in which to initiate a W. P. A. development program of the oyster reefs in Alabama. As a result of this survey James B. Engle was sent to Alabama in December by the Bureau to make a more detailed study of oyster cultural problems in Mobile Bay with the view of assisting the State in reviving the oyster industry.

The reefs north of Cedar Point were found to have only a sparse growth of seed oyster available for rehabilitation, being on the whole badly depleted, partly as a result, perhaps, of illegal dredging. As an alternate area for seed supply Dauphin Island was suggested, since in this region there are many small oysters in clumps which would break up during handling. In Bon Secour Bay the reefs were also found to be badly in need of reshelling, the shells found being pitted and disintegrating from age and decay. It was suggested that shucking houses use their discarded shells for this purpose.

In the shoals lying between Cedar Point and Little Dauphin Island, an area of 6,000,000 square yards of densely covered bottom, the oysters appeared to be overcrowded. Thus between 50,000 and 75,000 barrels of seed could be obtained from this area at present to the benefit of the beds.

A survey of conditions on reefs of western Mobile Bay showed a good quantity of seed in small clusters and singles, which could profitably be moved from this section to a bottom where there is less chance of spring freshets destroying the young stock.

In connection with these surveys an investigation was undertaken to determine the effect on oyster bottoms of opening channels into Dauphin Island Bay, now almost landlocked. It was concluded that resulting changes in salinity would probably not be seriously detrimental to marketable oysters, unless conditions throughout Mobile Bay and Mississippi Sound are bad. In any event, as a result of the exchange of waters and the consequent augmented supply of food organisms, oysters growing in those deepened regions should be superior in quality. They should also be benefited by the protection against adverse temperature which deep water affords.

OYSTER INVESTIGATIONS IN WASHINGTON STATE

Most of the work carried on at the Puget Sound Laboratory by Dr. A. E. Hopkins has been a continuation of the plan of study on the problems concerning the Olympia oyster, *Ostrea lurida*, and is inseparable from the general results obtained and recorded since the investigation was undertaken in 1931. The purpose of this investigation was to make a study of the factors influencing spawning and setting of the Olympia oyster in order to develop a system whereby oyster growers could be assured annually of an abundant supply of seed. Therefore, studies were made of spawning habits, larval life, and the attachment of the larvae.

Thermograph records of water temperatures taken continuously over a period of 5 seasons indicate that 13° and 14° C, the average temperatures of the water in which Olympia oysters begin to spawn in the spring, may not be called the critical temperature for some spawning takes place above and below this temperature range.

It has been found that after their discharge from the maternal brood chamber the larvae swim freely for a period of from 29 to 41 days, depending upon water temperature.

The relative number of spat caught daily per unit of cultch was obtained for each of the past 5 summers as follows: Wire baskets containing shells were planted throughout each season, allowed to remain in the water for a few days, and the collected spat counted. It has been found consistently that the setting of larvae occurs in well-defined periods directly correlated with tidal cycles. Typically setting is heaviest during a run of extreme minus tides. Experiments show that most of the larvae attach upon the flood tide, few at the ebb tide during this period. Very little setting occurs during neap tides. Thus, within certain limits, the waves of setting are predictable merely from the tide tables. On the basis of such results, oyster growers were advised as to the time to plant cultch for the collection of seed, and it is generally agreed that the industry has benefited materially by this assistance during the past several years.

Continued study of the effect of changes in salinity on the rate of feeding of the Japanese oyster have further shown these quantities to be directly correlated. When the salinity falls below approximately 13, the oyster appears to be unable to pump water. Above this level, within limits, the rate of pumping increases directly with salinity. These experiments provide the much-needed information about the effect salinity may have on transplanted oysters.

A study was begun on the spawning and setting habits of the Japanese oyster, which has recently become established on the Pacific coast. While the temperature of the waters in this State is in general somewhat too low for successful natural propagation of this species, it is evident that scientific investigations may show it possible for growers to produce their own seed instead of importing it from the Orient. In the summer of 1935 an investigation was begun to lay the foundation for a more extensive study of this problem during the next few years.

A matter requiring immediate attention is the Japanese oyster drill which, unfortunately, has been introduced into several waters in the State of Washington, and in one locality has done tremendous damage. This pest is not subject to control measures effective in other sections of the country because of its different biological reactions. Even in the middle of December when the water temperature averaged 10° to 12° C, egg cases of this species were found containing all stages of developing young from early embryos to small snails ready to escape. A detailed study of this drill is essential not only for the benefit of the Japanese oyster, but also for the protection of the native oyster of the Pacific coast.

YORK RIVER POLLUTION INVESTIGATION

In October 1935, under a special allotment of $20,000 received from the P. W. A., the Bureau began investigations at York River, Va., to determine what effect, if any, the pulp mill wastes discharged at West Point, Va., have on the oysters of this region. Local oystermen reported that the oysters were in poor condition, that many were stunted and discolored, with shells so thin they could almost be crushed in the hand. Formerly the York River oysters were noted for their superior quality and especially prized in the New York market. Dr. N. A. Wells was in charge of the field work, assisted by Dr. W. A. Chipman, A. D. Hasler, and L. Garriss.

This investigation has consisted mainly in field and laboratory studies on the effects of various concentrations of pollutants on the survival of oysters, their physiology, rate of feeding, and on the accumulation of glycogen in their tissues under various environmental conditions.

A building was leased in Yorktown, Va., and converted into a laboratory with a running sea-water system. Labor as well as considerable construction material was provided by the Fort Eustis Transient Camp under the direction of Paul B. Murphy. The Virginia Commission of Fisheries cooperated in the project making available the *Marguerite*, a 65–foot Diesel powered boat.

After the first week in October field stations were established, water and oyster samples being collected at stated intervals for chemical analysis. Up to the end of the year, eight cruises have been made on the York River, and three on the Piankatank River, which was selected for control observations.

Due to the efforts of Mr. Richard Armstrong, Commissioner of Fisheries of Virginia, the State appropriated $500 to defray the expense of planting experimental beds of oysters in the York and Piankatank Rivers during the Bureau's pollution studies. Between November and early January, seven beds were planted in the York River and two in the Piankatank. Samples of oysters were taken at regular intervals from these beds and analyzed as to glycogen content, shell weight, shell liquor, etc. Water samples were taken at the same time for chemical analysis.

Observations thus far show that living oysters in the upper part of the York River, near the pulp mill, have shells that are extremely thin and soft. Since this poor condition indicates that something may be interfering with the normal metabolism of the oyster, experiments are being planned to study calcium metabolism. It is of interest to note here that this abnormal shell condition has not been observed to exist in any other river emptying into the Chesapeake Bay, or in the bay proper.

Examination of tissues in oysters from the upper part of the river show them to be more flaccid and transparent than those from the lower part; they have less meat and less shell per unit of total weight, have a higher water content, and lower glycogen content.

In order to obtain a satisfactory solution of the pollution problem in the York River it will be necessary to have a complete picture of physical, chemical, and biological conditions in the river at the present time, and as much of an historical background as possible.

For information concerning the past history of the oyster industry in York River, the investigators are dependent upon the willingness of oyster planters to state the changes, if any, in their yield of oysters before and since the establishment of the pulp mill. Since they have agreed to cooperate in this, it is hoped that these invaluable data will be available.

In connection with the York River pollution investigation experiments were conducted in the Washington laboratory to determine the effect of the pollutant from the York River on the rate of propagation of diatoms which comprise the food of oysters. Other experiments are being carried out to determine the effect of various mineral salts on the propagation of diatoms. Numerous experiments along this line are under way.

BIOLOGY OF THE QUAHOG (*Venus mercenaria*)

An investigation of the life cycle of the quahog clam was carried on by V. L. Loosanoff at Milford, Conn., where specially constructed tidal tanks permitted the physiological observations under conditions very closely approaching those of the natural environment. During the year, observations were made on the gonad development of the clam and its feeding activity.

Young clams, when only 0.6–0.7 cm long, collected on the clam beds of Long Island Sound near Milford, Conn., in October, were found to possess distinctly bisexual gonads with very strong male predominance. In the majority of cases fully ripe spermatozoa occupied the central part of the lumens, while small oöcytes and oögonia constitute the inner walls of the follicles.

In the middle of the summer, when the water temperature reaches the critical point, the ripe spermatozoa are discharged. Soon afterward two distinct types of individuals become distinguishable as definite males and females. In the males a second period of spermatogenesis begins in the autumn and continues at a reduced rate throughout the winter. In the spring, with the increase of water temperature, rapid branching of gonad follicles takes place simultaneously with increased rate of spermatogenesis. The gonads then have the typical male character of the adult. Spawning follows later in the summer, when the size of the shell has reached a length of 3 cm or more.

In those individuals destined to become females the lumens of the follicles remain empty after the spermatozoa are discharged. At the end of the initial male phase the gonad follicles remain distended with only a thin layer of undifferentiated cells and small oöcytes along the inner walls. In many cases numerous phagocytes invade the follicles and devour the degenerated male cells. Oögenesis begins in the early spring. In June and July the follicles contain mature ova. The animals, formerly functioning as males, have now reached the stage of functional females.

The adults are, with few exceptions, of separate sexes. Among several hundred mature clams studied by means of serial sections only two cases of functional hermaphroditism have been observed. Nevertheless, examination of gonads of adult males reveals in almost every instance the presence of small oöcytes somewhere along the walls of the follicles. This may indicate the potentiality of changing the sex even in the adult condition, but so far there has been no evidence obtained to warrant such a conclusion.

Spermaries of adult males contain mature spermatozoa at all seasons of the year. When placed in sea water spermatozoa begin to swim actively in their typical spiral way after 2 to 3 minutes of quiescence. This simple experiment was tried at biweekly intervals throughout the year and always with positive results. The ovaries of adult females also contain large ova at all seasons of the year. In fact, little difference will be noted on superficial examination of samples collected in December and June. In both cases the follicles are large, distended, and filled with large oöcytes. In this respect the quahog differs remarkably from the American oyster, in which only shrunken follicles are found during the autumn and winter.

To study the effect of water temperature on the feeding of quahogs experimental animals were kept under natural conditions in large tanks in which the water was renewed with every tide. Each clam was immobolized by imbedding one of its valves in a mixture of cement and sand, and connected to the lever of a recording apparatus placed about 10 feet above. Each movement of the shell was recorded on the chart, and the temperature of the water was at the same time recorded by a thermograph. The clams were kept attached to the recording apparatus for varying periods of time ranging from 1 to 10 days. Usually the records of two clams were taken simultaneously. During these experiments the water temperature in the tanks varied from 0.0° to 28.0° C., thus covering the entire natural range of temperatures to which clams are subjected.

The hibernation of clams occurs when the water temperature is 4.9° C. or lower. Prolonged periods of opening of the shells and presumably active feeding and respiration proceeds at temperatures of 6.0° C. and above. This knowledge of the effect of temperature on the shell activities of the clam may add to a better understanding of several practical problems of the clam industry. Undoubtedly growth and fattening of clams, as well as development of sexual products, are dependent upon the length of time the shells are open because feeding can take place only during that time.

INVESTIGATIONS ON AQUICULTURE

H. S. Davis, *in charge*

Investigations on problems relating to aquiculture were continued along much the same lines as in 1934. Greater emphasis, however, was placed on field studies since it was believed that it will be impossible to utilize the products of our hatcheries to best advantage until we learn more about the various factors that affect fish in natural waters. Our lack of information on these fundamental facts is the greatest obstacle with which we now have to contend in developing a scientific policy of fish management. Opportunities for field investigations by the Bureau of Fisheries have been greatly extended through a recent cooperative agreement with the United States Forest Service, which provides that waters in the national forests may be utilized by the Bureau for experimental purposes.

POND-FISH CULTURE

Owing to lack of funds for construction of ponds at the Leetown station, investigations in pond-fish culture during 1935 were again limited to experiments conducted by O. Lloyd Meehean at the Natchitoches (La.) station. These studies were a continuation of those begun in 1934 which were designed to determine the relative value of different fertilizers in pond culture. Although the ponds fertilized with cottonseed meal had produced, on the average, more food than those in which other fertilizers were used, the results of the 1934 experiments were not conclusive. For this reason a different method was adopted in 1935. Instead of keeping the amount of fertilizer per unit area constant, and varying its composition in each pond as was done the previous year, the quantity of fertilizer was varied, the composition kept constant, and the length of the fertilizer period extended. In all cases cottonseed meal was used as a fertilizer.

It was found that the average weight of bottom organisms was greatest in ponds that received the smaller amounts of fertilizer. The data indicate that under conditions at Natchitoches a weekly application of about 25 pounds of cottonseed meal per acre is sufficient to maintain fertility.

It was found that in general an increase in the production of bottom organisms resulted in a corresponding increase in the production of bass up to about 105 pounds of fish per acre. After this point was reached further increase in bottom organisms had little effect on the production of fish.

Carbon and nitrogen determinations were made of the plants found in the ponds. These studies showed that the ponds produced from 3.86 to 6.81 tons (dry weight) per acre of vegetation. Furthermore, the equivalent of 189 to 282 pounds of nitrogen is tied up in the vegetation in an acre of water during the season, in other words, as much nitrogen as is found in 1.39 to 2.08 tons of 36 percent cottonseed meal. These results indicate the extent of the loss in food elements when large amounts of vegetation are removed from a pond as is the common practice in pond culture.

TROUT CULTURE

Feeding experiments.—Feeding experiments at the Pittsford, Vt., station during 1935 were confined to tests of a new food, sold under the trade name of "Egg-Glo", which has been highly recommended as a trout food by a number of fish culturists. It was found that on a diet of 30 percent "Egg-Glo" and 70 percent beef liver, rainbow fingerlings made a considerably slower growth than a fish on either a diet of 30 percent salmon egg meal and 70 percent beef liver, or a straight diet of beef liver. The mortality, however, was low and practically the same as in the lot fed beef liver only. The results with yearling rainbow trout were practically the same as with fingerlings.

In order to compare the value of seal meal and salmon-egg meal in the diet of trout, two lots of rainbow fingerlings, at the Leetown, W. Va., station were kept on experimental diets from September 23 to December 18. One lot was fed a ration composed of 60 percent beef liver and 40 percent seal meal while for the other lot salmon-egg meal was substituted for seal meal. At the end of the experiment the lot fed the seal-meal combination had gained 380.78 percent in weight while the lot fed the salmon egg meal combination had gained only 274.09 percent. The mortality was 10.2 percent and 16 percent respectively.

Selective breeding.—Breeding experiments designed to develop superior strains of trout were continued along the same lines as in previous years. Eggs from 48 selected pairs of brook trout were incubated at the Pittsford, Vt., station and as usual the best lots of fingerlings will be segregated until they mature. An exceptionally high percentage of these eggs hatched and, since they were taken from a stock of fish producing highly fertile eggs, it is a reasonable tentative assumption that this high fertility is a result of selection.

In the breeding experiments at the Leetown, W. Va., station eggs were taken from 38 pairs of selected brook trout, a part of which were select stock of the second generation. In an effort to obtain a strain of brook trout which will produce eggs better adapted to conditions at Leetown, stock is being selected at present on the basis of high fertility rather than of rapid growth, body symmetry or other characters. The present standard requirement for a select stock is a minimum of 70 percent reaching the eyed stage, an exceptionally high figure for brook-trout eggs at Leetown, the average being approximately 43 percent.

Breeding experiments have also been carried on with rainbow trout and with brown trout.

Nutrition studies.—Nutrition studies have been continued at the Cortland, N. Y., hatchery by Dr. C. M. McCay and A. V. Tunison. Three lines of research have been followed during the year: (1) Continuation of the study on growth of four species of trout fed similar diets, and maintained under similar conditions; (2) the determination of the amount of feed that should be fed per unit of weight to attain the most economical production; and (3) biochemical studies to determine the optimum amount of phosphorus and calcium needed by a growing trout. The four species used were: Lake trout (*Cristivomer namaycush*), brown trout (*Salmo fario*), rainbow trout (*Salmo irideus*), and brook trout (*Salvelinus fontinalis*).

The experiment to determine the relative ability of the species to convert feedstuffs into body tissues was continued through the 128th week. All four species were maintained under similar conditions and fed the same diet, consisting of two parts fresh beef liver and one part dry skim milk. The numbers were reduced from time to time to eliminate the factor of overcrowding. It was found that lake trout was the most efficient of the four species in the conversion of feedstuffs into live body weight under the conditions of this experiment, while the brown trout seemed to be least efficient.

Two lots of brook trout were fed separate diets in the experiments to determine the most satisfactory amount of feed that will produce the most economical gain in weight. One diet consisted of equal parts, by weight, of beef liver and trimmed beef hearts; while the other contained in addition to these meats dried skim milk, cottonseed meal, and whitefish meal. The results of these experiments show clearly that (1) within certain ranges, the efficiency of feed utilization is inversely proportional to the quantity fed; (2) the utilization of dry feeds is much less efficient than that of raw meats, although the dry feeds are more economical in cost; and (3) young fry probably need 10 percent of their body weight in feed while older trout, up to a length of 3 inches, need only about 5 percent. Hatchery feed bills can be greatly reduced if a more effective method of using dry feedstuffs can be discovered.

Experiments were conducted to determine the amounts of calcium and phosphorus in the trout body, and the source of these mineral elements. There is good evidence to show that trout absorb calcium from the water even as early as the egg stage. In the egg and the sac fry stages phosphorus was found to be 6 to 8 times more abundant than calcium. But during the subsequent period of rapid growth, the calcium content of the body increases rapidly until finally in older fish it tends to exceed the phosphorus content.

Field investigations.—To test the common belief that rainbow trout will not long remain in the smaller streams in which they have been planted (at least in eastern streams), experimental plants of yearling rainbow trout were made in the fall of 1933 and also in 1934 under the direction of R. F. Lord. These plants were made in the South Branch of Cold River, a small mountain stream with an average volume of 10 to 12 cubic feet per second.

An attempt was then made to keep account of the number of fish caught, by the following procedure: Anglers were provided with blank forms on which they were requested to state the number of fish they caught, as well as certain other information. These they were asked to deposit in mail boxes set up for the purpose conveniently near common parking places. The mail boxes were painted a brilliant red to attract attention, and advertised by conspicuous signs which were posted along the stream calling attention to the fact that the Bureau of Fisheries was attempting to secure data on the number of fish taken annually from the stream as a guide for future stocking.

As recorded in a previous report, the results for a similar experiment in 1934 were unsatisfactory, only 87 fish being reported out of 700 fish planted the previous fall. This was a return of approximately 12 percent, but it is probable that only a small proportion of the anglers reported, and that the actual total catch of planted fish was much greater than that figure.

In the fall of 1934, 1,000 yearling rainbows were planted in the same stream. These fish were marked by removing the right pelvic fin to distinguish them from the fish planted a year previously, which had the left pelvic fin removed. The fish were well distributed along the stream, every effort being made to avoid too great a concentration in any area.

During the first month of the open season a fair degree of cooperation was obtained from anglers, 66 reports being left in the mail boxes. In June, however, only one report was filed, although it is known that fish were still being taken. A total of 290 fish were reported for the season, 11 of these being fish that had been planted in 1933.

Furnace Brook in Rutland County was the only stream operated as a test stream in 1935. It is a clear-water stream, more or less rocky, with a bottom that remains fairly stable. The test area was approximately 4 miles in length, and commenced just above a falls that stops practically all upstream movement of fish. The stream averages about 25 feet wide and is subject to heavy fishing throughout its length. Both brook and rainbow trout are established in the stream, but only brook trout have been planted in this area in recent years. It was stocked in September 1934 with 2,400 legal-size trout.

During the fishing season, May 1 to August 14, 1935, inclusive, 1,197 angling reports were secured. These show that the season's catch consisted of 8,589 legal trout, of which 5,647, or 66 percent, were brook trout and 2,942, or 34 percent, were rainbow trout. The average number of fish per fishing effort was 7.2.[7]

The outstanding fact revealed by this study is the tremendous amount of angling being done by today's fishermen; and it is evident that under such conditions good fishing can be maintained only by continual management. So valuable has this study proved itself that plans have been perfected to set aside four test streams during the 1936 fishing season.

Studies on Big Spring Creek, Va.—A study of the production of rainbow trout in relation to the number of fish planted and the abundance of natural food was continued under the direction of E. W. Surber in a 1-mile section, comprising approximately 1.65 acres of water area, of Big Spring Creek, near Leesburg, Va. During the season, 124 trout of legal size were taken with hook and line. The total weight of these fish was 57.47 pounds, a yield of 34.83 pounds per acre. This result compares favorably with those obtained in 1933 and 1934 when yields of 29.7 and 27.66 pounds per acre, respectively, were obtained.

Bottom samples were taken at monthly intervals, and the wet and dry weights of the organisms determined after they had been counted and identified. The average wet weight of bottom organisms for the year ending September 9, 1935, was 6.695 grams per square foot. The average dry weight of these samples was 1.321 grams. This is a material increase over the previous year, when there was an average wet weight of 5.047 grams and an average dry weight of 0.982 grams per square foot.

A total of 1,080 fingerling rainbow trout were planted in the fall of 1934 in Big Spring Creek. These fish were marked by removing the right ventral fin so that they could be distinguished from those produced by natural propagation. Sixty-five fish thus marked were recaptured—a return of 6.02 percent of the fish planted. While it thus appears that only a small percentage of the fish planted reached legal size, the results are much better than in the previous year, when only nine marked fish were recaptured.

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[7] "Fishing effort is the fishing done by 1 man during the course of 1 day, regardless of how long a period or how many times he fishes during the day.

COOPERATIVE WORK IN NATIONAL FORESTS

Under the terms of a cooperative agreement recently completed with the United States Forest Service the Bureau of Fisheries assumes responsibility for conducting research necessary for the development of a comprehensive program of fish management for waters of the national forests.

Owing to lack of funds the Bureau was unable to continue stream surveys in the national forests during the summer of 1935, and its activities in connection with stream improvement were confined to exercising technical supervision over the work carried on in this field by the Forest Service.

During the latter part of May a short field course for training men to plan and direct stream-improvement work was conducted by the Bureau and the Forest Service in the Pisgah National Forest, N. C. Early in June a similar training school was conducted in the Cache National Forest, Utah. At the close of these training courses the men were employed by the Forest Service to take charge of stream-improvement work in national forests throughout the country.

The stream-improvement work carried on during the last 2 years has been largely experimental, the ultimate aim being to determine to what extent this work can be relied upon to improve angling conditions. The results indicate that in streams notably lacking in pools and shelter much can be done to provide better living conditions for fish. In some cases it has been possible to provide additional spawning beds and to improve those already present, thus permitting a considerable increase in natural propagation.

In the average mountain stream dams in one form or another have been found to be more valuable on the whole than any other type of structure. Since such streams are often deficient in pools and are subject to the scouring action of frequent floods, structures are needed that will tend to retard erosion rather than accelerate it. Deflectors have also been used to advantage, but usually have proved most valuable when used in connection with dams to improve circulation in pools and to prevent deposits of silt and sand.

A considerable part of the stream-improvement work has consisted of the removal of obstructions of various kinds that interfered with the movements of fish. Other work has been the planting of trees, shrubs, and other vegetation to furnish shade and beautify the banks. It is evident that in many instances reforestation will do more to improve stream conditions than all other methods combined.

In view of the urgent need for further information on the value of stream improvements and on other means of improving fishing conditions in the national forests, arrangements were made for a number of experimental projects in this field. These projects, which are being carried on in cooperation with the Forest Service, and in some cases with State conservation agencies, are designed to throw more light on the more important factors concerned in fish management.

The most extensive project of this kind has been planned for the Pisgah Division of the Pisgah National Forest. This forest affords an exceptionally favorable opportunity for investigations of this nature, since it contains many excellent trout streams which are under the complete control of the Forest Service. It is proposed to use these streams for a demonstration of scientific stream management as a means of improving angling conditions. A rearing station is being constructed on the headwaters of the Davidson River, where fish required for stocking can be reared to the required size.

A similar arrangement was completed for the use of certain streams in the Big Levels Game Management Area in the George Washington National Forest. Work on these streams was started in August 1935.

California trout investigations.—Excellent progress has been made on the cooperative program, organized in 1932, with the California Division of Fish and Game. No radical changes were made this year in the field program, which consists of work along two major lines of effort: The Hot Creek brood-stock experiments and the coastal-stream steelhead studies. Dr. P. R. Needham is in general charge of the field program and in direct charge of the Hot Creek project, while A. C. Taft has supervision of the coastal-stream steelhead project. Two assistants, Leo Shapovalov and Leo Erkkila, are supplied by the State Division of Fish and Game.

Lack of funds prevented continuance of stream and lake surveys on the scale begun in 1934 with P. W. A. funds. However, brief biological surveys were made by staff members on Salton Sea, Bucks Lake, Lake Merced, and Lake Arrowhead, in California.

Studies on the steelhead of the coastal streams have continued and additional work has been undertaken on the Klamath River.

At Scott and Waddell Creeks, in Santa Cruz County, a census of the run is made each year in order to determine the basic facts in the life history of the steelhead and silver salmon, such as age, growth, migration, and the return from given escapements. At Scott Creek during the 1934–35 season the run was somewhat larger than during the previous 2 years and totaled 585 fish. Nearly 45 percent of the fish were grilse, and, judging from the number of marked fish among them, they were largely from the planting of the previous year. On February 12, 5,608 fish which had been reared at the hatchery ponds during the previous summer were released below the dam. Losses were very heavy in the ponds, due to an outbreak of furunculosis. Although this epidemic, if continued, may seriously hamper the work, the survivors are being marked and planted in an effort to determine if they and their progeny will show an increased resistance to the disease.

Judging from the number of silver salmon and steelhead trout taken at the Waddell weir during the two seasons in which it has been operated, the run of adult fish was somewhat greater during the past season. The number of steelhead migrants, however, was smaller, perhaps owing to the loss of adult fish from furunculosis during 1933–34. The downstream movement of cottoids was repeated at the same season as in 1933–34, but the run was greatly reduced in size.

On the Klamath River marked steelhead have been planted in Fall Creek and Beaver Creek, two moderate-sized tributaries of the upper river. During May 1935 an additional lot of 29,000 fish were marked by the removal of both ventral fins and planted in the West Fork of Beaver Creek. This planting of marked fish was made with the dual purpose in view of comparing the more detailed findings made at Waddell Creek with the somewhat different conditions found on the Klamath, and of establishing an annual run of marked fish which would give some indication of the varying intensity of fishing in the main stream below.

In May the ponds at the Hot Creek station were drawn down and the survivors of the select lots of fingerlings that had been planted in the previous July and August were netted out, graded, and the best retained for brood-stock purposes. An average survival rate of 23.36 percent obtained after a period of approximately 9 months in the four natural ponds used. A total of 27,300 pedigreed trout weighing 717 pounds were planted in nearby waters from the Hot Creek ponds this year.

The number of select brood stock held for experimental breeding purposes now total 1,597 fish, representing five different strains of rainbow. The majority of these fish will reach spawning age in the fall and winter of 1936–37, when actual selective breeding tests will be started.

Remarkable growth rates have obtained in spring water at Hot Creek at 63° F. On natural foods, starting with fish between 2 and 3 inches long, growth averaged approximately half an inch per month. In a feeding experiment 100 rainbow averaging 5 inches in length were fed a diet of 30 percent liver (fresh weight), 35 percent salmon egg meal, and 35 percent abalone chips. Under the regime, growth averaged approximately 1 inch a month. Another lot of the same size and kind of fish held under identical conditions, but fed only pure shrimp collected from watercress beds grew on the average 0.82 inch per months. The experiments with both lots of fish were run for a period of 85 days. It required 3 pounds of the liver—salmon egg meal—abalone chips diet to produce a pound of trout at a cost of $0.28 per pound of trout raised. The cost of this diet was $0.084 per pound. It required 9.57 pounds of shrimp (wet weight) to produce a pound of trout in the shrimp fed lot.

Excellent returns were obtained from the Angora Lake planting experiment this year, 136 catches, yielding 809 trout, being recorded. Marked fish of the 1933 and 1935 plants combined formed 77 percent of the 809 caught in 1935. Only 23 percent of the catch were unmarked trout. No marked trout were caught prior to the 1935 fishing season. The average catch per angler in 1934 was 2.3 fish and in 1935, 5.9 fish.

A plant of 2,014 marked rainbow trout averaging 5.67 inches in length was made in Convict Lake on July 20, 1935. The object of this plant was the same as those made in Angora Lake; viz, to compare numbers actually taken by anglers with numbers planted. Another object was to test a new system of boat records from which the catch per unit of effort from year to year could be determined.

The results obtained are most promising. The catch per unit of effort[8] was determined as 0.21 fish per hour per angler. Boat fishermen filled out 106 catch-record blanks. Only 50 percent of the parties renting boats actually caught fish. For those taking trout the average catch per boat was 3.6 fish. The average length of the rental period was slightly over 4 hours. Of the 2,014 marked rainbows, 349 or 17 percent of the total plant were caught. By using the proportion of marked to unmarked rainbows caught, it is possible to estimate roughly the total rainbow population of Convict Lake. Catches of shore fishermen were likewise recorded; and trout caught both by this group of fishermen and persons fishing from boats totaled 848 fish. Of this number 25 percent were loch leven, 33 percent unmarked rainbow, and 41 percent marked rainbow of the 1935 plant. Approximately 76 percent of all fish taken were caught by shore fishermen while 24 percent were taken from boats. Boat fishermen caught larger fish hence more pounds than shore fishermen obtained, but they caught fewer fish. By determining the catch per unit of effort annually a definite measure of the trend of the fishery in the lake will be obtained. Thus, the effects of any system of management, stocking, or restrictions put into effect by fish and game authorities can be ascertained.

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[8] Here "catch per unit of effort" is not the same as "catch per fishing effort" defined on p. 440.

FISH DISEASES

As in previous years, the study of fish diseases was largely confined to investigations of epidemics at hatcheries and the development of better methods of control. The establishment of a pathological laboratory at Seattle, Wash., in charge of Dr. Frederic F. Fish has made it possible to devote more attention than formerly to disease problems in the intermountain region and the Pacific Coast States.

The major investigations of the West Coast Pathology Laboratory during the past year have been directed towards a reduction in the toll of salmon and trout taken by diseases in the hatcheries. As the presence or absence of disease largely determines the advantage of artificial over natural propagation, the work of this laboratory has been directed chiefly toward preventing diseases rather than attempting to develop new methods for treating them after they have appeared. The prophylaxis of fish diseases represents a practically unknown field, and many preliminary problems had to be satisfactorily solved before a suitable technique could be evolved. The method chosen for experimental disease prevention work was the routine application of a constant and weak concentration of a disinfectant to the running water supply of a hatchery trough for a uniform period of 1 hour at weekly intervals. This method, commonly known as "prolonged dipping", was favored because it involves a minimum amount of labor for its application, and does not necessitate the handling of the fish in any way. Consequently it solves the disease-control problem for the one-man hatchery.

Although it has been definitely demonstrated that at least certain parasitic diseases of trout may be prevented by routine prophylaxis, disease-prevention work is still in the experimental stage. The losses attending prophylaxis are materially lower than those occasioned by therapeutics. Attempts to cure epidemics of parasitic protozoa have invariably involved considerable losses of fish even though the treatments were carefully administered at the first indication of trouble. The disinfectants available for disease-prevention work are many, and present efforts are directed towards the determination of the maximum concentration of each practicable disinfectant tolerated by trout, and the minimum disinfecting concentration effective against each type of pathogenic organism. The eventual goal of the disease prevention investigations is the development of a technique involving the use of some disinfectant, or combination of disinfectants, which may be applied under ordinary hatchery conditions with a minimum of effort and which will prevent the appearance of most, if not all, diseases of hatchery trout and salmon.

Another research project of this laboratory concerns the epidemiology of fish diseases—likewise a new field of endeavor. Through the generous cooperation of the Division of Fish Culture, daily loss records are kept on individual lots of fish by all hatcherymen in the intermountain and Pacific coast regions. An accurate loss record is thus available for every lot of fish from the time they are brought to a hatchery until they are finally liberated. Over a period of time, an analysis of these records should not only yield reliable information concerning the efficiency of individual hatcheries, but should likewise demonstrate many of the factors responsible for losses, and the exact effect of efforts to correct these factors. Such information should prove of great value in raising the efficiency of the entire system of artificial propagation of trout and salmon.

During the year, studies were undertaken on the relative sterilizing power of the various disinfectants commonly used at hatcheries. For such studies, a modified phenol coefficient technique was employed and a strain of *Bacterium salmonicida* was chosen as the test organism. It was indicated that any concentration of these disinfectants capable of killing *B. salmonicida* during an exposure of 1 hour was likewise fatal to fish life in the same period of time. A concentrated solution of calcium hypochlorite proved to be the most satisfactory disinfectant for sterilizing ponds not containing fish and for nets, dippers, and other hatchery utensils.

The more basic pathological studies on individual diseases of fish were continued during the year. A previously unrecognized type of gill disease, of similar pathology but different etiology than the bacterial gill disease common to eastern United States, was found affecting both trout and salmon at several western hatcheries. This disease was apparently of bacterial origin, and although several organisms were isolated in pure culture from infected gill tissue, suitable opportunity for experimental infections has not yet been available. Until such experiments are accomplished it is impossible to state which one, if any, of the cultivated organisms is responsible for the disease. This western variety of gill disease has failed to respond favorably to any known form of treatment. Apparently by the time the presence of this disease is realized, the host is so weakened through extensive tissue alteration that it is unable to withstand the additional rigors of treatment.

In addition to the definite long-term projects summarized above, numerous field trips have been made to assist the hatchery men with their disease problems.

A new disease known as "white mouth", affecting tropical fish in the Southern States, was found to be due to infection with *Bacillus* *columnaris.* This organism, known to cause serious losses among bass, crappie, sunfish, etc., when they are handled in warm weather, has not previously been reported among aquarium fish. It affects tropical fish chiefly during shipment. Evidently as the result of injuries caused by bumping against the sides of the can, the lower jaw becomes infected, the infection advancing along the floor of the mouth until it reaches the gills. This bacterial growth forms a white felt-like mat from which the disease derives its name. The disease can be easily controlled in early stages by treatment with a dilute solution of copper sulphate or other disinfectant.

It is now evident that an attempt to eradicate furunculosis at the Leetown (W. Va.) experimental hatchery has been entirely successful. During the summer of 1934 several lots of brown and brook trout yearlings developed the disease. Immediately all fish in the infected lots were destroyed and the pools disinfected with chlorine gas. Inasmuch as no signs of furunculosis have appeared at this station since that time it is evident that the disease was completely eradicated. This case is of special interest since it demonstrates that, if taken in time before it has become established, furunculosis can be stamped out at a hatchery without a significant loss of fish.

The investigation into the causes of "blue-sac" were continued at the Leetown station by E. W. Surber. It was suggested that the trouble might be due to the high free carbon dioxide content of the hatchery water supply (about 44 parts per million). Accordingly a series of experiments was conducted to investigate the relation between the acid-base equilibrium and the health of trout. It was found that:

1. Raising the free carbon dioxide content of the water to 60.7—62.1 parts per million resulted in a decreased hatch, and an increase in the number of deformed fish.
2. Brook trout eggs in soft water can develop normally in relatively high concentrations of free carbon dioxide (39 p. p. m. at Ogletown, Pa., 42.03 p. p. m. at Lewistown, Md.).
3. Blue-sac was not nearly so evident in water neutralized with sodium hydroxide, but since the general effect of this chemical was otherwise so deleterious there appears to be no advantage in its use.
4. The addition of sufficient caustic soda to neutralize most of the free carbon dioxide in the water is injurious to brook trout eggs, reducing the hatched fry to about 28 percent or less of the original number.
5. Brook trout eggs are more sensitive to the chemical changes brought about by the addition of caustic soda than are rainbow eggs, which in earlier experiments were either unaffected or benefited by its addition.

The functions of the Disease Service were greatly expanded during the year, and a large number of specimens submitted by Federal, State, and commercial hatchery men were examined and diagnosed at both the Washington and Seattle laboratories. Although in most cases the service is limited to the examination and diagnosis of preserved material, it has been of great assistance in enabling fish culturists to adopt proper control measures before epidemics were so far advanced as to render such measures ineffective.

FISHERY INVESTIGATIONS IN INTERIOR WATERS

M. M. ELLIS, *in charge*

POLLUTION STUDIES

The growing menace of pollution in the fresh waters of the United States by erosion, and by municipal and industrial wastes has been accepted fatalistically by many as inevitable because the basic facts, chemical, physical, and biological, concerning stream pollution generally have not been available. The menace is spreading not only throughout the various river systems but into the impounded waters as well, and threatens at various points the waters of the public domain and of the national playgrounds. Consequently remedial and corrective measures compatible with the interests of fisheries and with economic necessities have not been easy to define.

To meet this situation the Columbia (Mo.) field unit of the United States Bureau of Fisheries has been conducting for some time investigations to ascertain: (1) The natural conditions favorable for fish and other aquatic life in unpolluted waters, so that a polluted stream can be defined with fairness to all concerned; (2) the specific effects on fish and other aquatic life, and on the aquatic environment itself, of the various types of effluents which are being turned into the fresh waters of the United States.

Much effort has been given to devising suitable tests for the determination of the extent of stream pollution that could be applied practically in the field.

A set of water standards has been defined, based upon the results of thousands of tests and analyses made in all of the major river systems of the United States. The common variables in stream water; namely, dissolved gases, salts, turbidity, and ammonia are defined with reference to the limits constituting a suitable environment in which desirable fish can thrive. These standards provide a background for the study of stream pollution regardless of its source or extent.

Detailed biochemical, physiological, and pharmacological studies of over 40 types of effluents have been made, from which the specific effects of these effluents on fish and other aquatic life, as well as the reactions of these effluents with the stream water itself have been determined. From these studies it has been possible to make definite recommendations for practical remedial measures in various cases of stream pollution. As this work is continued more such applications can be made.

Mobile units, housed in autotrucks, have been perfected for the field study of stream pollution. These field laboratories make it possible to cover large distances rapidly, and to obtain at the source of pollution data supplementing the experimental tests conducted at the central laboratory at Columbia, Mo., and at the branch laboratories for trout studies at Bozeman, Mont., and for long-time tests on warm-water fishes at Fort Worth, Tex.

During the past year, in addition to the general work outlined above, specific pollution investigations have been made in Maine, Pennsylvania, West Virginia, Tennessee, South Carolina, Virginia, Montana, Idaho, Arizona, New Mexico, Texas, Oklahoma, and in the Mississippi Valley, through cooperation with the War Department, the Department of the Interior, the Tennessee Valley Authority, various State organizations, and several industrial concerns.

The future work of this unit calls for advancing as rapidly as possible the detailed studies of the effluents themselves, as only through an understanding of the actions of these effluents on fish and other aquatic life can remedial measures be expected. Besides, new types of effluents are constantly appearing as new industrial developments are made.

The surveys of particular streams having specific pollution problems are to be furthered as rapidly as funds permit, as the work of this unit has by no means covered all of the types of existing stream pollution.

MUSSEL PROPAGATION

During the past year the long-time experiments on growing fresh-water mussels in restricted areas have been continued at Fort Worth, Tex. These experiments, which will tell their complete story only after several years of actual test under practical conditions such as are being maintained at Fort Worth, continue to give promising returns. It is interesting in this connection to note that similar efforts are being made with some success to raise oysters in crates and confined areas off the bottom in silt-laden water, utilizing methods similar to those employed at Fort Worth with fresh-water mussels.

INDEPENDENT ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORIES

WOODS HOLE, MASS.

Owing to lack of funds, the Woods Hole laboratory was not maintained on an operating basis in 1935. Although facilities were utilized in connection with the oyster investigations reported upon elsewhere, no independent activities were possible.

This condition not only retards progress in the Bureau's fishery investigations, but also loses to the Bureau the advantage formerly gained from results obtained by independent investigators through use of the laboratory's facilities. Correction of this condition is urgent.

BEAUFORT, N. C.

Facilities for the study of marine-fishery problems of the South Atlantic region were provided throughout the year by the Beaufort laboratory under the direction of Dr. H. F. Prytherch. The chief investigations conducted here by the Bureau's staff, as reported in detail elsewhere, consisted of experiments and studies with reference to (1) the biology and control of the oyster drill, (2) the distribution and abundance of oyster pests in the coastal waters of Virginia, North Carolina, South Carolina, and Georgia, (3) a protozoan parasite of the oyster, (4) an improved method of handling oyster meats, (5) the development of the ovaries of the commercial shrimp, and (6) food of the commercial shrimp.

The laboratory serves as headquarters for oyster investigations in the South Atlantic and Gulf States, and has cooperated with the conservation departments of Virginia, North Carolina, South

Carolina, Georgia, Florida, and Mississippi in planning and directing extensive operations for the rehabilitation of public oyster beds in the respective States with funds provided by the Federal Emergency Relief Administration and Works Progress Administration. In North Carolina assistance was given to the N. C. E. R. A., and the conservation department in technological, statistical, and administrative matters pertaining to the formation of a cooperative fishermen's organization which began operation in October 1935.

Laboratory facilities for marine research have been provided for eight independent investigators from other institutions who were engaged in the following studies: Prof. H. V. Wilson, University of North Carolina, experimental-histological studies on the cellular structure of sponges; J. W. Culbertson, under supervision of Professor Wilson, on the breeding times of sponges; J. S. Denby, Brevard College, study of marine fauna and the ecology of a typical sand shoal; J. H. Pratt, Jr., Harvard Medical School, disposal of industrial and domestic trade wastes at Beaufort, N. C., and vicinity in relation to municipal supply and sea-food industries; Prof. Hoyt S. Hopkins, New York University, effect of reducing agents on oxidation of tissue in mollusks; Dr. F. G. Walton-Smith, Commonwealth Fund Fellowship, England, physiology of oyster larvae; Dr. Hugh S. Darby, Columbia University, development of the fiddler crab; R. S. Collie, North Carolina State Museum, collection and preparation of marine animals for exhibition.

Terrapin culture.—The propagation of diamond-back terrapin was continued at the Beaufort laboratory in cooperation with the Division of Fish Culture and yielded, in 1935, a total hatch of 13,245 young terrapin, which is the greatest annual production obtained in these operations. The highest previous record was that obtained during the preceeding year when a brood of 12,446 was produced in the five separate breeding pens. During August and September the newly hatched terrapin were collected from the protected egg beds and transferred to the large rearing house where they were given special care and feeding in order to get them in good condition before hibernation. During the winter months, or hibernating period, the young have been kept in a newly constructed outdoor pen located in one of the large terrapin pounds on the north side of the laboratory. The hibernating pen, having a length of 56 feet and a width of 10 feet was constructed with concrete walls and close fitting, movable wood covers so as to insure complete protection of the young against damage by rats and mice as occurred during the previous season. The distribution of the 1935 brood will be made during the spring of 1936 throughout the South Atlantic coastal waters in cooperation with the various State conservation departments.

ICHTHYOLOGICAL INVESTIGATIONS

Investigations in Panama.—Upon the request of Dr. Herbert C. Clark, director of the Gorgas Memorial Laboratory, Panama City, cooperative investigations with that laboratory were made in Panama. Dr. Samuel F. Hildebrand was detailed for the work by this Bureau. Largely because of the splendid cooperation offered by Dr. Clark and various Panama Canal officers, a comparatively large area was covered and a large amount of work accomplished in the short time from January 26 to March 11.

Dr. Clark particularly desired to obtain an identified series of the more common local species of fishes for the laboratory collection, principally for use in determining the species from which parasites are obtained for study from time to time by the staff helminthologist, Dr. Aurel O. Foster. As many species as possible were collected and later identified in Washington. Representatives of 97 more or less common species have been sent to the Gorgas Memorial Laboratory. Many more species were obtained which require further study for exact determination. In the laboratory in Washington Dr. Hildebrand was assisted by Louella E. Cable.

The time chosen for the investigation was particularly auspicious because the Gatun Locks were dewatered, giving the investigators not only an opportunity to "gather" fish on the bottom, but also to see and study the fauna present in the locks. The two species of fish present in great abundance in the two lower levels of the locks were the "blue jack", *Caranx hippos*, and the "bony fish", *Elops saurus*. Other species present in these levels of the locks were the tarpon, several species of snappers, a few groupers, and a considerable variety of less common and smaller fish and minnows. The upper chamber of the locks, in which the water is quite fresh at all times, contained only a few large tarpons, a few marine mojarras, *Gerres plumieri*, a few anchovies, and several small fresh-water fishes.

It is often asked whether the locks are a passageway for fish. It is understood, of course, that strictly marine fishes, even though they should succeed in passing through the locks could not endure the fresh water of Lake Gatun. However, there are some species that are able to pass from salt to fresh water and vice versa without evil effects. Among these is the tarpon, now a regular inhabitant of Lake Gatun. It also occurs in Miraflores Lake, which it could reach only by passing through Culebra Cut and the locks at Pedro Miguel. A special effort was made to determine whether this fish breeds in one of these fresh-water lakes or adjacent arms and streams. However, no evidence indicating that breeding is taking place in fresh water was secured. It seems probable, therefore, that the locks are used as a passageway by the tarpon, and very probably by a few other species.

Upon the request of Col O. G. Brown, chief health officer of the Panama Canal, inspections were made of a large area of Gatun Lake, where a very profuse growth of Chara occurs, which at low water stages, as during the dry season, forms a very bothersome breeding area for mosquitoes. The situation, however, did not seem to be one that would lend itself to control by the use of fish.

Collections also were made at the Pearl Islands where local sportsmen maintain a fishing club, and where very excellent sport fishing is to be had. Small shore fishes were extremely scarce at the time the collections were made but a short distance offshore fishes were abundant and several species that apparently are new were obtained by trolling. Much more work is required to determine all the species secured there.

It was possible, also through the generosity of Dr. Clark and others to fly to the Rio Chiriqui Viejo near the Costa Rican border in southwestern Panama, to investigate the results of a plant of rainbow trout made by the Bureau of Fisheries in the upper stretches of this stream in 1925. It was found that the trout were abundant as had been reported by sportsmen. The temperature of the water during the several days spent on the stream in February at an elevation of about 6,000 feet varied from 54° F. in the morning to 57° F. in the late afternoon. Based on 45 digestive tracts examined, about 90 percent of the food injested by the trout consisted of caddisfly larvae and nymphs. The remaining food included beetle larvae and a few adults, mayfly larvae and nymphs, dragonfly larvae and nymphs, stonefly larvae and nymphs, net-veined midge larvae, a few midgefly larvae, a few adult terrestrial insects, and very few ostracods and amphipods.

MARINE FISHES OF THE GULF COAST

Systematic studies of the American fishes in general, and those of the Gulf coast in particular were continued by Isaac Ginsburg. Special attention was given to the revision of genera of the difficult families Pleuronectidae, Gobiidae, and Cyprinodontidae. These revisional studies should place the systematics of some of the more difficult marine families on a firm scientific foundation.

SILVER SPRINGS, FLA.

During the latter part of August, Dr. Samuel F. Hildebrand spent several days collecting fish in Silver Springs, Fla. Because of the clearness of the water it was found impracticable to collect with a seine during the day, as the fish were able to see the net and the collectors, and invariably retreated to a safe distance or depth. Consequently most of the collecting was done at night.

Altogether 25 species of fishes were obtained in Silver Springs. They consist of 2 species of gars, the bowfin, 2 species of catfish, the common fresh-water eel, a jack-pike or pickerel, the white mullet (a marine fish), 5 species of sunfish, the large-mouth black bass, and 11 species of minnows belonging to 5 different families. The collection, of course, is not exhaustive, but it very probably includes nearly all the regular residents.

Fishing is prohibited in the springs and large fish are fairly numerous, it being possible to see the entire population even to a depth as great as 50 or 60 feet, because of the clearness of the water. Small fish and minnows, however, are rather scarce. Evidently the springs have as large a population of predatory fishes, such as the bass, bowfin, catfish, gars, jack-pike, and sunfishes as can find sufficient food.

Lake Mattamuskeet.—Upon the request of the North Carolina Conservation Commission, Dr. Samuel F. Hildebrand was detailed to make an investigation of Lake Mattamuskeet to supplement another investigation made earlier in the year by other representatives of the Bureau (Messrs. Jackson, James, and Surver). The principal purpose of the investigation was to determine the comparative abundance of large-mouth bass, and the status of the supply of food present for these fish. It had been alleged that the lake, which at one time was drained and then reflooded during recent years, was overpopulated, and that some of the fish should be removed.

It was found that although bass were numerous, food, such as minnows, young fish, and crustaceans, was scarce. It was found, furthermore, that the bass were mostly in an emaciated condition and were heavily parasitized, principally with the copepod of the genus *Lernaeocera*. Although adults were numerous, there were practically no young bass, indicating cannibalism. It was recommended that, although adult bass were numerous, the fish be left in the lake, partly because they were parasitized and partly because virtually no young bass were present. Under the circumstances, it seemed clear that with the limited amount of sport fishing permitted, the population would soon be reduced naturally until a "biological balance" would be reached, as has happened in other recently flooded areas previously observed by the investigator.

EASTERN TEXAS SURVEY

Dr. Hildebrand identified a collection of fish for R. T. Richey of College Station, Tex. The specimens were collected in eastern Texas, in connection with a survey made by Mr. Richey for the Game, Fish and Oyster Commission of Texas. The identifications are to be used in a report on the survey.

OTHER COLLECTIONS

In connection with the study of pollution of inland waters, Dr. M. M. Ellis made collections of 452 specimens of small and young fishes. The specimens were taken in many different sections of the United States, from Maine to South Carolina and from Montana to New Mexico. Dr. Hildebrand, assisted by Louella E. Cable, identified 69 species in the collections.

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